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NEW ZEALAND AMATEUR RADIO

CALLBOOK

AND RADIO REFERENCE

NEW ZEALAND ASSOCIATION OF RADIO TRANSMITTERS INC.



Radio Reading Service



**Your
Invitation
to
Listen**

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Level 1, Ken and Little Building, 29 Queen Street West, Levin
NZ Radio For The Print Disabled (Inc)

PO Box 360, Levin 5540

For e-mail, refer to website: www.radioreading.org.nz

This is a non-commercial, voluntary, Radio Station, established and operated by **New Zealand Radio For the Print Disabled (Inc)**. The station commenced broadcasting on May 9 1987 and is funded from: donations, subscriptions, bequests and limited sponsorship along with assistance from **New Zealand On Air**. **Listeners' Comments and Reception Reports** are particularly valued by the Station.

We read whole
information as it is
printed from:

- Newspapers
- Magazines
- Periodicals

An example of Amateur Radio serving the wider Community

Wellington Mountain Radio Service Inc.

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Canterbury Mountain Radio Service Inc.
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Collection Points for Radios:

Rotorua: 24 Iles Road, Rotorua

Palmerston North: Hunting and Fishing

Wellington Mountain Radio Service: Hutt Valley (04) 564-6929

Wellington: (04) 479-2144

Otaki: (06) 364-8441

Masterton: (06) 377-0987 or (06) 377-0426

Palmerston North: (06) 356-9450

Wanganui: (06) 345-6624

Canterbury Mountain Radio Service: (03) 343-5029

DOC Te Anau & Wanaka (Fiordland & Mt Aspiring National Parks)

Methven: (03) 302-8410

Nelson: (03) 544-7085

Hokitika: (03) 755-6135

Takaka: (03) 525- 9576

Dunedin: (03) 454-3262

Southland Field Radio: (03) 216-3751

Listen to live traffic on 3345kHz and 3261kHz USB



OFFICIAL JOURNAL OF
THE NEW ZEALAND
ASSOCIATION OF RADIO
TRANSMITTERS INC.



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NEW ZEALAND AMATEUR RADIO CALLBOOK AND RADIO REFERENCE

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THE AMATEUR'S CODE

The Radio Amateur is:

CONSIDERATE ...

never knowingly operates in such a way as to lessen the pleasure of others.

LOYAL ...

offers loyalty, encouragement and support to fellow amateurs, to local clubs and to the New Zealand Association of Radio Transmitters, through which Amateur Radio is represented to Government, to the International Amateur Radio Union and to the International Telecommunication Union.

PROGRESSIVE ...

with knowledge abreast of science, a well-built and efficient station and operation above reproach.

FRIENDLY ...

slow and patient operating when requested; friendly advice and counsel to the beginner; kindly assistance, co-operation and consideration for the interests of others. These are the hallmarks of the amateur spirit.

BALANCED ...

radio is an avocation, never interfering with duties owed to family, job, school or community.

PATRIOTIC ...

station and skill always ready for service to community and country.

- Based on the original written by Paul M. Segal, W9EEA, in 1928.

AMATEUR RADIO

What is Amateur Radio?

Amateur Radio, also affectionally known as "Ham radio", is a hobby of constructing, experimenting and communicating with radio equipment. In New Zealand, the Ministry of Economic Development (Radio Spectrum Management) issues licenses to Radio Hams. Once licensed, an amateur can operate radio equipment from home, from their vehicles or from anywhere in New Zealand. A number of radio frequencies have been set aside for Amateur Radio. Using these frequencies a Ham can talk across town or around the world. The scope and possibilities are endless – from talking across town to your local repeater to operating in international contests or talking through Amateur Radio satellites.

Who can be Hams?

Just about anyone can become a Ham. Some famous muscians, actors, kings and prime ministers are Hams, but most are people from all walks of life who like communicating and experimenting with radio and electronics. Young people find Amateur Radio a great training ground, older people find "ham radio" an absorbing retirement hobby. Amateur Radio is more than a hobby, it is also a service. Hams willingly contribute their time, equipment and operating skills whenever the need arises, especially during Civil Defence emergencies and search and rescue operations. The Amateur

Radio Emergency Communicatons (AREC) are a sub group of NZART that organises emergency communications for the Emergency Services.

How do I become a Ham?

Passing a Ham license is quite easy. For an Amateur Radio license you need to correctly answer 40 out of 60 questions from a multi-choice question paper. The questions cover radio theory and regulations. You can download the questions from the public domain question-bank at <http://www.nzart.org.nz/nzart/exam>. As a newly licensed Ham you will be able to operate on amateur bands below 5MHz or above 25MHz. After three months operation and with 50 logged contacts you will be able to operate on all New Zealand amateur bands.

Where do I get more information?

The New Zealand Association of Radio Transmitters (Inc.) is a non-profit association of Amateur Radio Operators. NZART has branches and instructors in most of hte larger cities and town. For more information on Amateur Radio and details of a club near you, contact: The Business Manager, NZART, PO Box 40-525, Upper Hutt. Email nzart@nzart.org.nz or check out the NZART website at <http://www.nzart.org.nz>.



New Zealand Association of Radio Transmitters

INC
(Founder Member of the International Amateur Radio Union Region 3)

Mail to: BUSINESS MANAGER, PO BOX 40-525, UPPER HUTT 5140, NEW ZEALAND

PLEASE ENROL ME AS A NEW MEMBER AS FOLLOWS:

| | | | | | | |
|---|---|----------------------------------|---------------------------------|-----------------------------------|------------------------------------|--|
| TRANSMITTING <input type="checkbox"/> | NON-TRANSMITTING <input type="checkbox"/> | STUDENT <input type="checkbox"/> | FAMILY <input type="checkbox"/> | OVERSEAS <input type="checkbox"/> | ASSOCIATE <input type="checkbox"/> | CONCESSIONARY <input type="checkbox"/> |
| MR MS MRS MISS | INITIALS | SURNAME | | | | |
| ADDRESS | | | | | | |
| | | | | | | |
| POSTCODE | | | | | | |
| OCCUPATION | | | | DATE OF BIRTH | | |
| CALL-SIGN PREFERRED BRANCH, NAME OR NO PLEASE FIND ENCLOSED \$ MY SUBSCRIPTION TO Dec 31 2011 I agree to abide by the NZART Constitution Signature: | | | | | | |

The information requested (other than date of birth) is for membership records required to be maintained under the Incorporated Societies' Act 1908. Date of Birth is requested for statistical purposes only.

Membership benefits include the automatic inclusion of transmitting call-sign holders' address details in *Call Book* (published annually).

If you DO NOT wish your details published please sign below:

I DO NOT want my address details published by NZART _____

IF YOU PREFER TO PAY BY CREDIT CARD PLEASE COMPLETE

| | | |
|-------------------------------|--------------------------------------|-------------|
| VISA <input type="checkbox"/> | MASTER CARD <input type="checkbox"/> | EXPIRY DATE |
| CARD No. | | |

Signature: _____

FROM THE EDITOR

This year's Call Book is a full edition and it will be published on a CD later in 2010 when back issues of *Break-In* and the WIA Call Book are available in an electronic format for inclusion on the CD.

Thanks to all those who have given their time to contribute to the content of this publication. I know I became a thorn in the side of some people when I believed that the updated information they could provide was essential to the usefulness of Call Book.

Online databases have little restriction as to how large they become. This makes it difficult to prune some of them to a suitable size while still retaining their usefulness for reproduction in Call Book.

Some people send me their updated address details, please remember that the *call-sign* information published in Call Book is that provided by the Ministry of Economic Development Radio Spectrum Management (RSM) from their database. At present we are unable to amend *call-sign* data due to legal constraints; therefore if you require changes to your *call-sign* information you must advise RSM by telephone or online; but also please advise NZART so that our records can be kept current. More details about this are available at the start of the *Call-sign* lists.

73

de Lorne Douglas ZL2AHB / ZL3LSD



CHANGE OF ADDRESS NOTIFICATION

To
The Business Manager, NZART
PO Box 40-525, Upper Hutt 5140

Name _____ Call-sign _____ Membership No. _____

Old Address

New Station Address:

_____ Postcode _____

Break-In postal address (if different):

_____ Postcode _____



REMEMBER: if you change your address you **MUST** notify the
Ministry of Economic Development (Radio Spectrum Management) 0508 776-463
AND the Business Manager, NZART.

PLEASE POST THIS FORM TO THE BUSINESS MANAGER, NZART AT THE ABOVE ADDRESS.



NZART MEMBERSHIP SERVICES

Liaison with the **Ministry of Economic Development, Radio Spectrum Management** group; for regulatory and radio spectrum matters and for the protection of the Amateur Service.

International Representation: the New Zealand amateur radio society and the New Zealand member society of the International Amateur Radio Union.

A National Headquarters: the focal point in New Zealand for Amateur Radio, enquiries and activities.

Public Service Involvement: by the Amateur Radio Emergency Communications (AREC) for Civil Defence, Search and Rescue, with related activities and training.

Amateur Repeater Service: co-ordination by the Frequency Management and Technical

Advisory Group.

Amateur Beacon Service: co-ordination by the Frequency Management and Technical Advisory Group.

Spectrum Band-planning: co-ordination by the Frequency Management and Technical Advisory Group.

Technical Standards and Policies: co-ordination as required.

Monitoring System: to exercise continuing active protection for our radio frequency bands.

Satellite Co-ordination: liaison with amateur satellite organisations worldwide.

Satellite Support: donations and fundraising as required.

Headquarters Infoline: on-line frequently and direct to your mailbox with up-to-date information and news releases.

Official Broadcast: transmitted monthly.

Official Journal Break-In: published two-monthly, New Zealand Amateur Radio's continuing record.

Amateur Radio Call-Book: published annually.

NZART Website: www.nzart.org.nz for up-to-date information with past reference and activity records.

Annual Conference: our national forum.

VHF Convention: two-yearly, organised by enthusiasts, constructors and experimenters.

Education and Development Group: for promotion of Radio Training.

Examination Division: for Amateur Operator Certificates, *call-signs* and qualifications.

Reciprocal Qualifications: advice for travellers to or from New Zealand.

Third Party Insurance: for NZART activities, branches and AREC.

QSL Bureau: for dispatch and collection of QSL cards.

Contests and Awards: administration, branch, national and international.

Video Tape Library: for branch borrowing.

Morse Practice: arranged as required.

A selection of sale items from HQ: with member discounts.

Special Projects from time-to-time: such as funds for promoting radio in developing countries.

ZL6A Headquarters Station: of the New Zealand Association of Radio Transmitters.

NZART MEMBERS ORDER FORM

| NZART Publications and Supplies | Price each | Non Member | Quantity required | Cost |
|---|----------------|----------------|-------------------|------|
| Additional copies of <i>Break-In</i> | \$6.00 | \$10.00 | | |
| Amateur Radio in New Zealand – The new rules explained | \$8.00 | \$10.00 | | |
| Amateur Radio Logbook | \$10.00 | \$12.50 | | |
| Amateur Radio Training Manual Fifth Edition (spiral bound) | \$24.00 | \$30.00 | | |
| <i>Call Book</i> 2010-2011 | \$20.00 | \$30.00 | | |
| <i>Ham Shacks, Brass Pounders and Rag Chewers</i> | \$5.00 | \$20.00 | | |
| Log Sheets (per 10) | \$2.00 | \$5.00 | | |
| Secret Listening | \$5.00 | \$10.00 | | |
| NZART Examination Questions (bound copy) | \$15.00 | \$20.00 | | |
| NZART CD ROM Study Guide | \$10.00 | \$12.50 | | |
| <i>Examination DVD – Set of 13</i> | \$50.00 | \$50.00 | | |
| NZART Badge – <i>Call-sign</i> | \$9.30 | N/A | | |
| – Life Member of Branch | \$13.60 | N/A | | |
| – OTC Blue | \$9.70 | N/A | | |
| – Plain | \$3.70 | N/A | | |
| NZART Pen | \$2.00 | \$4.00 | | |
| Plastic coated name badge | \$10.50 | N/A | | |
| NZART Subscription: Transmitting/Family/Overseas/Student T = \$95 / F = \$125 / O = \$110 (air) / O = \$95 (surface) / Student \$45 | | | | |
| TOTAL \$ | | | | |

Prices include GST plus P&P and are subject to change without notice. Please include full remittance with order. Non-members add 20% to all prices. Overseas members will incur additional postage dependent on country.

Examination Application Fee \$5.00 (administration costs to Branch)

New/Lapsed Call-sign and Certificate of Competency \$95.00*

Secondary Call-sign \$50.00

One Letter Call-sign \$50.00

Change of Call-sign \$50.00

Replacement Certificate \$25.00

* Receive one year free membership to NZART from 1 January until 31 December in the same year. If joining after 1 October, membership will expire 31 December the following year.

NZART INFORMATION

NZART Address: Suite 9 19 Main Street Upper Hutt. P O Box 40 525 Upper Hutt 5140.
Ph: 04 939 2189, Fax: 04 939 2190
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Debby Morgan ZL2TDM

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NZART, C/- P O Box 40 525,

Upper Hutt 5140

FMTAG

Chairman: David Andrews ZL2SX

Secretary: Doug Ingham ZL2TAR

Frequency Co-ordinator: Doug

Ingham ZL2TAR

PO Box 40-525 Upper Hutt 5140

Email: <fmtag@nzart.org.nz>

Local Government Liaison Officer

Mike Newman; MD ZL1BNB

E-mail: <localgovt@nzart.org.nz>

Address: 30 Nikau Street, Wanganui

Phone: 06 344 6830

Monitoring Service Co-ordinator

John Martin ZL1GWE

E-mail: <MS@nzart.org.nz>

57 Crescent Road East, Palm Beach,

Waiheke Island

Overseas IARU Liaison Officers

John Lochhead ZL4QS

E-mail: <iaru@nzart.org.nz>

Reciprocal Licensing Bureau Manager

Joe Reed ZL2AH

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Address: 7A Humphrey Street,

Marton 4710

Phone: 06 327 7003

Region 3 Officers in NZART

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E-mail: <peter.lake@xtra.co.nz>

Peter Norden ZL2SJ *Region 3 Beacon*

Coordinator

E-mail: <zl2sj@nzart.org.nz>

QSL Bureau Manager

Barry Stewart ZL2RR

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P O Box 857, Wanganui

VHF/UHF/SHF Records Co-ordinator

Simon Lewis ZL4PLM

E-mail: <vhfrecords@nzart.org.nz>

NZART Web Master

Jamie Pye ZL2NN

E-mail: <webmaster@nzart.org.nz>

Phone: 04 528 9693

NZART's PRIORITIES:

The interests of its TRANSMITTING MEMBERS, and, the access by RADIO AMATEURS to bands throughout the RADIO FREQUENCY SPECTRUM, by membership and active support of the INTERNATIONAL AMATEUR RADIO UNION.

NZART Headquarters

Visitors welcome.
Hours 9am – 2.30pm Tuesday-Friday
Suite 9, 19 Main Street, Upper Hutt

Business Manager

Debby Morgan ZL2TDM
Phone: 04 939 2189
Fax: 04 939 2190
Email: <nzart@nzart.org.nz>
Postal: P.O. Box 40-525, Upper Hutt 5140

NZART Subscriptions 2010/11

| | |
|---------------------------|----------|
| T Transmitting | \$95.00 |
| A Associate | \$95.00 |
| B Branch | \$95.00 |
| N Non-Transmitting | \$95.00 |
| F Family (Transmitting +) | \$30.00 |
| G Family Non-Transmitting | \$30.00 |
| S Student | \$45.00 |
| O Overseas (No GST) | \$95.00 |
| O Overseas Airmail | \$110.00 |

Break-In Editor:

J. R. L. Walker ZL3IB
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All articles and letters to the Editor:

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Editor

Break-In

PO Box 1733

Christchurch 8015

CHANGE OF ADDRESS or DELIVERY PROBLEMS

Advise the Business Manager
PO Box 40-525, Upper Hutt 5140

Official Broadcast

J. A. Meachen ZL2BHF
E-mail: <zl6a@nzart.org.nz>
The monthly NZART Official Broadcast is made by ZL6A, AUCKLAND 3900kHz LSB on the last Sunday of each month except December, when the broadcast is made on the Sunday before Christmas.
The broadcast is also made on the National System and some VHF repeaters.
The time of the broadcast is 2000 hours. A repeat broadcast is made at 2100 hours.
Members and Branches are welcome to submit material to ZL2BHF, C/- NZART Headquarters, PO Box 40-525, Upper Hutt 5140 for inclusion in the broadcasts.

Conference Official Broadcast

The Official Conference Broadcast is held on the Sunday of Queen's Birthday Weekend at 2000 hours.

PRESIDENTS

| | | | | | |
|-----------|----------------|--------|-----------|---------------|--------|
| 1926-1927 | E A Shrimpton | Z2XA | 1953-1955 | R H Hanley | ZL2GU |
| 1928 | R J Orbell | OZ1AX | 1955-1958 | H F Arnold | ZL3HA |
| 1929 | R J Orbell | ZL1AX | 1958-1960 | J F Freeman | ZL1VA |
| 1930 | T R Clarkson | ZL1FQ | 1960-1962 | G M Salt | ZL1CK |
| 1931 | H P V Brown | ZL3CG | 1962-1964 | R T Woodfield | ZL2VN |
| 1932 | D Wilkinson | ZL2AB | 1964-1966 | C G Liddell | ZL3ND |
| 1933 | N W Laugesen | ZL3AS | 1966-1969 | H Burton | ZL2APC |
| 1934 | W G Collett | ZL4BP | 1969-1970 | W R Hamer | ZL2CD |
| 1935 | C N Edwards | ZL1AA | 1970-1972 | D A Lloyd | ZL4PG |
| 1936 | W M Hall | ZL2BF | 1972-1973 | D E Cleland | ZL1IY |
| 1937 | R B Dodds | ZL4FK | 1973-1974 | J F C Johnson | ZL2AMJ |
| 1938 | L G Petrie | ZL2OV | 1974-1977 | W D Gorman | ZL2IY |
| 1939 | F W Sellens | ZL2MY | 1977-1983 | A G Godfrey | ZL1HV |
| 1940 | B E Jackson | ZL2FJ | 1983-1985 | D J Mckay | ZL3RW |
| 1941-1942 | W Fouhy | ZL2LB | 1985-1991 | T D Carrell | ZL3QL |
| 1943-1944 | C G Liddell | ZL2BI | 1991-1992 | T C King | ZL2AKW |
| 1945-1946 | E B Lough | ZL2OG | 1992-1997 | J A Meachen | ZL2BHF |
| 1947-1949 | C G Liddell | ZL2BI | 1997-2001 | A J Wallace | ZL1AMW |
| 1949-1950 | J F Freeman | ZL2AFB | 2001-2005 | A P Norden | ZL2SJ |
| 1950-1951 | C T Berry | ZL2BY | 2005-2009 | W L B Douglas | ZL2WP |
| 1951-1953 | W J Wainwright | ZL3LI | 2009- | D R Symon | ZL2KH |

HONORARY LIFE MEMBERS

| | | | | | |
|-------|------------------|--------|-------|----------------|--------|
| 1934* | N W Laugesen | ZL3AS | 1980* | F R W Andrews | ZL2IJ |
| 1943* | F W Sellens | ZL2MY | 1982 | G C Blackwell | ZL3NT |
| 1946* | W Fouhy | ZL2LB | 1983* | A G Godfrey | ZL1HV |
| 1947* | W D Gorman | ZL2IY | 1985 | J F C Johnson | ZL2AMJ |
| 1948* | J F Freeman | ZL2AFB | 1986* | C W Parton | ZL3CP |
| 1948* | G McB. Salt | ZL1CK | 1987* | D Wilkinson | ZL2AB |
| 1948* | T R Clarkson | ZL2AZ | 1989* | R S H Morgan | ZL2GQ |
| 1949* | A F Leader | | 1990* | G A Kilpatrick | ZL1BBS |
| 1950* | W M Hall | ZL2BH | 1992* | D J MacKay | ZL3RW |
| 1950* | Mrs W Hall | | 1992 | R L Baldwin | W1RU |
| 1953* | R Cassey | ZL2IQ | 1996 | R W G Kingston | ZL4MK |
| 1954* | J G Howard | ZL4FR | 1998 | R N Copeland | ZL2AKV |
| 1961* | J M White | ZL2GX | 2000 | J A Meachen | ZL2BHF |
| 1964* | H F Arnold | ZL3HA | 2000 | T D Carrell | ZL3QL |
| 1966* | C G Liddell | ZL3ND | 2002 | G E Bold | ZL1AN |
| 1972* | M R O Montgomery | | 2004 | R E Knowles | ZL1BAD |
| 1975* | A R Harris | ZL4CA | 2005 | J C Pye | ZL2NN |
| | | | 2009 | D V Andrews | ZL2SX |

*Denotes deceased

NZART EXAMINATION SUPERVISORS

Effective 23 June 2010

| Auckland Central & Auckland Eastern Suburbs | |
|---|---|
| Morse & theory | |
| Selwyn Ross ZLIBRC 5 Roxy Terrace Glendowie. Ph Hm 09 575 8847 E-mail rosssj@xtra.co.nz | Will arrange to suit |
| Steve Miller ZLIFS 2/329 Kohimarama Road St Heliers, Auckland 1071 | |
| North Shore 29 | |
| Rosemary Boshier ZL1RO Ralph Boshier ZL4AG 30 Ayton Drive, Glenfield Ph: 09 444 5735 E-mail rboshier@ihug.co.nz | |
| South Auckland 65 | |
| Dave Johnston ZLIAMN 2/29 Manse Road, Papakura Ph 09 298 9297 E-mail davola@clear.net.nz (See also ZL1BBZ below) | |
| Western Suburbs 03 | |
| Ross Reddell ZLIVRR E-mail ross.reddell@xtra.co.nz 394b Mt Albert Road, Mt Roskill Ph: 09 629 0504 Mob: 027 622 1055 | |
| Auckland Region (Morse & Theory) | |
| Bob Holt ZL1BBZ 10 Collingwood Road, Waiuku Phone: 09 235 9549 E-mail fred.b@spacecom.co.nz | Bob will arrange venue |
| Don Webster ZLICV 46 Speight Road, Kohimarama Phone: 09 575 5554 E-mail donaldw@xtra.co.nz | |
| Morse Expert | |
| Gary Bold ZLIAN 15 Kauri Road, Birkenhead Ph: 09 483 7240 Fax: 09 373 7445 E-mail g.bold@auckland.ac.nz | Gary will arrange venue |
| Alexandra Branch 61 Central Otago Branch | |
| Brian Skeet ZL4PN baske@xtra.co.nz 1 RD, Dunstan Road Alexandra. Ph: 03 448 7245 | |
| Ashburton Branch 01 | |
| Phil N Rodgers ZL3TIK 29 Porter Street, Ashburton Phone: 03 308 4036: E-mail rogers@voyager.co.nz | Ashburton Aircraft Museum, Ashburton |
| Other Supervisor: | |
| Gordon Mattingley ZL3AQ 89 Creek Road gmatt@paradise.net.nz Ph 03 308 8555 | |
| Michael Trump ZL3TPQ 60 Beach Road, Hampstead Ashburton 7700 Ph: 03 308 7119 Cell: 021 143 5762 E-Mail mtrump@orcon.net.nz | |

| Bay of Islands Branch 84 | |
|---|--|
| Nicholas Lachlan Wallace ZL1IU Signal Road, R D 1 Okaihau Ph: Hm 09 401 9042 Bus 025 281 7220 E-mail zlliu@xtra.co.nz | |
| Blenheim Branch 22 Marlborough Branch | |
| William Cousins ZL2AYZ b.cousins@xtra.co.nz 20 Buick Street, Blenheim Ph: 03 579 3121 | |
| Francis Stretch ZL2ALE dknoff7ock@xtra.co.nz Villa 44, 11b North Street Blenheim. Ph 03 577 9309 | |
| Christchurch Branch 05 | |
| Des Rowe ZL3AK 10 Marama Crescent Christchurch 8 Ph: 03 384 2514 E-mail drcr.rowe@xtra.co.nz | Christchurch Br NZART Club Rooms 27 Galbraith Avenue Avonside |
| Morse Examiner | |
| Rob Thirkettle ZL3RX 10a Ilam Road, Christchurch Ph: 03 364 2510 E-mail rob.thirkettle@canterbury. ac.nz | |
| Kelvin Barnsdale ZL3KB 50 Cardrona Street CHRISTCHURCH E-mail KB.EW@ xtra.co.nz | |
| Christchurch West Branch 56 | |
| Doug Pratt ZL2BCF 345 Wigram Rd, Halswell dougpratt@orcon.net.nz Ph: 03 322 9961, Wk 03 358 1607 | |
| Baden Melhuish ZL3VI 34 St Andrews Hill Road badenj@ xtra.co.nz Ph: 03 384 1584 | |
| Walter E Smith ZL3CR 9 Wolsey Place, Hillmorton | |
| Dunedin Branch 30 Otago | |
| Dermot Mayock ZL4DMM 21 Fulton Road, Glenleith Phone: 03 471 8475 E-mail dodgermot@clear.net.nz | Otago Br NZART Club Rooms 109 MacAndrew Road Dunedin |
| Morse: | |
| Bob Cole ZL4AR 03 488 3898 E-mail: reginald@clear.net.nz | |
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| Ronald O Brott ZL1FC 494 Church Road, R D 2 Kaitia Ph: 09 408 0729 Mob: 027 4900 611 E-mail: zl1fc@xtra.co.nz | |

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| James Grumwald ZL1BG 112 Virtue Crescent, R D 3 Tokerau Beach. Ph: 09 408 7235 E-mail: grumwald@kol.co.nz | |
| Eric Manning ZL1GE E-mail: ericos@kol.co.nz Lake Ngati, RD 1, Awanui Ph: 09 406 7059 | |
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| Tom McDonald ZL1TO 25 John Street, Pukekohe Ph: 09 238 8580 E-mail: zl1to@nzart.org.nz | |
| Gisborne Branch 11 | |
| Peter Kenny ZL2QK 14 Wildish Court, Gisborne Ph: 06 868 5946 ZL2Qk@xtra.co.nz | Cosmopolitan Club Grey St Gisborne |
| Gore Branch 08 | |
| Eastern Southland Alistair Allan ZL4AO Charlton R D 4, Gore Ph: 03 208 7288 Mob: 025 321 914 E-mail: anallan@esi.co.nz | |
| Alan Falconer ZL4AF Whiterig P O Box 214 | |
| Gore Phone 03 208 7335 Dick Whyte ZL4AQ 8 Margaret Street Gore Phone: 03 208 6793 | |
| Morse Examiner: | |
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| Phil King ZL1PK P O Box 606, Hamilton Ph: 07 847 1320 E-mail pdking@xtra.co.nz | Hamilton Amateur Radio Club Rooms 88 Seddon St Hamilton |
| Tom Powell ZL1TJA 17 Murray Street, Maeroa Ph: 07 8343461 raetom@zip.co.nz | |
| Robin Holdsworth ZL1IC Sexton Road R D 1 Hamilton Ph: 07 855 4786 robin.judy@xtra.co.nz | |
| Hastings Branch 13 Hastings/Havelock North | |
| Leith Jennings ZL2AL 87 Auckland Road Napier Phone: 06 844 1226: Mobile: 021 050 8164 E-mail leejen@paradise.net.nz | |

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| Huntly Branch 17 | |
| Tony Case ZL1UD E-mail zl1ud@nzart.org.nz 8c Breckons Avenue, Nawton Hamilton Ph: 07 850 5218 Mob: 027 661 0828 | |
| Invercargill Branch 37 Southland | |
| Neville Checketts ZL4OX 21 Highfield Tee, Invercargill Ph: 03 216 6599 E-mail nevcheck@paradise.net.nz | Amateur Radio Centre 249 Ettrick St Invercargill |
| Kapiti Branch 69 | |
| Dave Chapman ZL2DWC dave@kennel.co.nz 183 Valley Road, Paraparaumu Ph: 04 298 7252 Mob: 0274 433 095 | |
| Russ Lawrence ZL2BSQ | |
| Morse | |
| Bill Cox ZL2BIL Ph: 04 902 2630 E-mail: billcat@paradise.net.nz 5A Konini Grove, Raumati Beach 5032 | |
| Kawerau Branch 67 | |
| Robert E Krause ZL1TMK 7 Gordon Street, Kawerau Ph: 07 323 8560 | |
| Janet Musto ZL1JAN 57b Peace Street janetmusto@xtra.co.nz Ph: 07 307 1204 | |
| Edwin Musto ZL1BBO 57b Peace Street edwinmusto@xtra.co.nz Ph: 07 307 1204 | |
| Barry D Liddle ZL1CAY 3 Hinemotu Avenue, Kawerau Ph: 07 323 8970 Mob: 021 223 2901 barry.liddle@xtra.co.nz | |
| Kaitaia Branch 78 Far North District | |
| Eric Manning Lake Ngatu, R D 1, AWANUI Ph: 09 406 7059 E-mail: ericos@kol.co.nz | I H C Centre Te Reinga Street Kaitaia |
| Russell Victor Shackleton 8 Rongopai Place, Kaitaia Ph: 09 408 0057 | |
| Ronald Owen Brott 494 Church Road, R D 2, Kaitaia Ph: 09 408 0729 Ph: 027 4900611 E-Mail zl1fc@xtra.co.nz | |

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| Masterton Branch 46 Wairarapa | |
| Ian Stewart ZL2TIS 99 Upper Plain Road Masterton Ph: 06 377 0713: E-mail zl2tis@contact.net.nz | |
| Motueka Branch 24 | |
| Jim Jackson ZL2BCG 246 Thorpe St, Motueka Ph: 03 528 8357 Fax 03 528 8707 | Call to arrange venue |
| Manukau Branch 21 | |
| Terry Rist ZL1TR 1-139 Wyllie Road Papatoetoe Auckland Ph: 09 279 9677 E-mail terry.r@paradise.net.nz | |
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| Chris Muir ZL1BOE 18 Water St, Howick Ph: 09 534 0557 E-mail cbmuir@xtra.co.nz | |
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| John Neal ZL3LI 118 Budge St, Blenheim 7201 Ph: 03 577 7442 E-mail john.pam@xtra.co.nz | |
| Marton Branch 23 | |
| Joe Reed ZL2AH 7A Humphrey Street, Marton Ph: 06 327 7003 E-mail joereed@actrix.co.nz | |
| Nelson Branch 26 | |
| Letitia (Topsy) Scott ZL2LS 74 Dodson Valley Rd, Atawhai Ph: 03 545 0237 Mob: 027 851 295 E-mail scott@tasman.net | |
| David Scott ZL2BCA As Above Cell: 0274 464 714 | |
| New Plymouth Branch 27 | |
| Frank Hunt ZL2BR Marsland Hill, 8 Manu Crescent New Plymouth Phone: 06 753 5604: E-mail zl2br@ihug.co.nz | New Plymouth CDHQ Robe St New Plymouth |
| North Canterbury Branch 68 | |
| Owen Pimm ZL3GM 50 Ohoka Meadows Drive RD 2, KAIAPOI | |
| Tony Buckland ZL3HAM E-mail zl3ham@nzart.org.nz 3100 Tram Road, RD 1, Oxford E-mail buckland@scorch.co.nz | |
| Oamaru Branch 64 North Otago | |
| Neil McLeod ZL4SN 65 Stuart St, Oamaru Ph: 03 434 7253: E-mail Neil-Marlene-Mcleod@xtra.co.nz | Civil Defence Rooms Severn St, Oamaru |
| Opotiki Branch 72 | |
| Steve Winder ZL1ACE 138 Wellington Road, Opotiki Ph: 07 315 7333 E-mail zl1ace@wave.co.nz | |

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| Jane Lake ZL1ONE | |
| Jim Jones 12 Buchanan St, Opotiki Ph: 07 315 7067 | |
| Palmerston North Branch 20 Manawatu | |
| Ian Thompson ZL2IAN 8 Dampier Ave, Palmerston Nth Ph: 06 357 4545 E-mail i.Thomson@ucol.ac.nz | Manawatu Amateur Radio Society Totara Road Palmerston North (Near Racecourse rear entrance) |
| Morse | |
| Peter Moore ZL2AUB 54 Herbert Avenue Palmerston North zl2aub@inspire.net.nz | |
| Papakura Branch 65 | |
| Dave Johnson ZL1AMN 63 Red Hill Road Papakura Ph: 09 298 9297 E-mail davola@clear.net.nz | |
| Richard Gamble ZL1BNQ 19a Chiania Pl, Howick Ph: 09 537 1238 Wk: 09 272 0114 E-mail gambler@xtra.co.nz | |
| Morse | |
| John Balsillie ZL1ALZ E-mail gubit@xtra.co.nz | |
| Geoff Reed ZL1AKY | |
| Rangiora Branch 68 | |
| North Canterbury Denise Hider ZL3HI 2 Matson Close, Rangiora Ph: 03 313 4907: E-mail d.hider@xtra.co.nz | |
| Tony Buckland ZL3HAM 3100 Tram Road Bennetts RD 1, Oxford Ph: 03 312 5352 E-mail buckland@scorch.co.nz | |
| Owen Pimm ZL3GM 50 Ohaka Meadows Drive Mandeville RD 2, Kaiapoi 7092 Ph: 03 3106070 E-mail owen.pimm@gmail.com | |
| Rotorua Branch 33 | |
| Ted Bretherton ZL1MG 24 Iles Rd, Lynmore, Rotorua Ph: 07 345 9687 mparkinson@clear.net.nz | Wohlman House 3 Hinemoa St, Rotorua (opp Kingsgate Rotorua Hotel) |
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| G W Bateman ZL2BHD 54 Murray Avenue, Hawera Ph: 06 278 4793 E-mail: gfbateman@clear.net.nz | |
| N W Barry ZL2HL 20 Gladstone St, Hawera Ph: 06 278 7607 | |
| South Wairarapa 82 | |
| Stan Mangin ZL2BLQ 33 West St, Greytown 5953 Phone: 06 304 9871 E-mail mangin@infogen.net.nz | |

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| Brian Evans ZL2CT South Featherston Road R D 1, Featherston Ph: 06 308 9992 | |
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| Ian Walker ZL1BFB E-mail zl1bfb@xtra.co.nz 51 Coronia Crescent Mt Roskill, Auckland | |
| Taumarunui Branch 38 | |
| Jeffrey Fuller ZLIMRX 26 Sunshine Rd, Taumarunui Ph: 07 895 8352 | |
| Taupo Branch 60 | |
| Nigel Badman ZL1CAL 36A Woodward St, Taupo Ph: 07 376 7200 E-mail nbadman@xtra.co.nz | |
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| Peter Coe ZLIWH E-mail pete.coe@xtra.co.nz | |
| Graham Messenger ZL1BVO Ph: 07 378 4162 | |
| Tauranga Branch 39 | |
| Bill Richardson ZL1APD Civil Defence HQ Barkes Corner, Cameron Road 57 Esk Street Greerton Tauranga Ph: 04 578 9317 E-mail bilric@kinect.co.nz | |
| Brian Heywood ZL1IE 41 Merriman Place, Veda Glen Ph: 07 543 3677 brian@eol.co.nz | |
| Tauranga Emergency | |
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| Bill Richardson ZL1APD 57 Esk Street, Tauranga Ph: 07 578 9317 | |
| Brian Heywood ZL1IE 41 Merriman Pl, Veda Glen Ph: 07 543 3677 brian@eol.co.nz | |
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| Te Puke Branch 53 | |
| Andrew Moffatt ZL1MOF 90 Hartford Ave, Papamoa Tauranga Ph: 07 572 4935 E-mail zl1mof@nzart.org.nz | |

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| Syd Rowe ZL1LWR Ph: 07 5331029 E-mail syd.rowe@xtra.co.nz | |
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| (Morse Examiner) | |
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| Derek Stansfield ZL1CYK Ph: 07 544 4642 E-mail zl1cyk@nzart.org.nz | |
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| Ken Hayhurst ZL1ATV 10 Richmond Villas 82 Richmond Street Ph: 07 868 7330 E-mail k.hayhurst@xtra.co.nz | |
| Timaru Branch 34 South Canterbury | |
| David Hetherington ZL3UDH 43 Otipua Rd, Kensington Timaru E-mail thehs@xtra.co.nz Ph: 03 688 3619, | |
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| Brian Williamson ZL1BYO 158 Elizabeth St, Tokoroa Ph: 07 886 5658 E-mail hwilli@xtra.co.nz | |
| G D Henley ZL1GDH 4 Carson Street | |
| D K McCartney ZL1DKM 5 Anderson St, Putaruru | |
| Upper Hutt Branch 63 | |
| Gavin Smith ZL2ACT ZL2act@nzart.org.nz 26 Sheridan St, Upper Hutt Ph: 04 970 8533 | |
| Morse (& Exam Assistant) | |
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| Waihi Branch 43 | |
| Bill Richardson ZL1APD 57 Esk Street Tauranga Ph: 07 578 9317 | |
| Wairarapa Branch 46 | |
| David Bray ZL2BA E-mail zl2ba@nzart.org.nz 35 Wavell Crescent, Masterton | |
| Neil Richardson ZL2UN E-mail nrichardson@xtra.co.nz 5 Kitchener Street, Masterton | |
| Paul Greenwood ZL2GRE E-mail zl2gre@gmail.com 7 Cooper Street, Masterton | |
| Wanganui Branch 48 | |
| Theory/Regulations | |
| Barry Stewart ZL2RR 1 Caversham Rd, Wanganui Ph: 03 345 4152 E-mail zl2rr@xtra.co.nz | Will arrange a venue |

| Morse | |
|---|--|
| Mike Newman ZL1BNB 30 Nikau St, Wanganui Ph: 03 344 6830 E-mail mnewman@clear.net.nz | Will arrange a venue |
| Wellington Branch 50 | |
| Bob Stewart ZL2AMI 105 Orangi-Kaupapa Road Wellington Ph: 04 475 8448 E-mail rstewart@paradise.net.nz | Wellington College, Main Admin Building Basin Reserve Wellington |
| Other Supervisors are | |
| Ralph Sutton ZL2AOH E-mail zl2aoh@ihug.co.nz 12c/186 The Terrace, Ph: 04 473 4087 | |
| Wellington VHF Branch 74 | |
| David Andrews ZL2SX 66 Khandallah Road Wellington Ph: 04 479 5786: E-mail andrews@clear.net.nz | |
| Other Supervisors are: | |
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| Westland Branch 49 | |
| Theory/Morse Examiners | |
| Bob McQuarrie ZL3TY Weenink Road, Greymouth Ph: 03 768 7388 b_mcquarrie@minidata.co.nz | Greymouth Police Station Guinness Street Greymouth |
| David Shae ZL4CP | |
| Kevon O'Sullivan ZL3ABY | |
| John Melse ZL3KC | |

| Westport Branch 49 Reefton/Buller | |
|---|---|
| Kim McLaughlin ZL3WPT 42 Dommett St, Westport Ph: 03 789 6942: E-mail paulkim@xtra.co.nz | Candidates call Kim to arrange where to go to sit exam |
| Whakatane Branch 51 | |
| Eastern Bay of Plenty | |
| Alan McDonald ZL1PI 9 Gateway Dr, Whakatane Ph: 07 308 7740 | Civil Defence HQ Waiewe Rd (off Hillcrest Rd), Whakatane |
| Janet (ZL1JAN) & Edwin (ZL1BBO) Musto 57b Peace St, Whakatane 3120 Ph: 07 307 1204 E-mail edwinmusto@xtra.co.nz or janetmusto@xtra.co.nz | |
| Whangarei Branch 28 | |
| Charlie Moates ZL1DAC Ph: 09 434 7292 charliemoates@xtra.co.nz | NZART Br Club Rooms Whangarei Museum Heritage Park, Maunu, Whangarei |
| Morse | |
| Paul Slako ZL1PC Phone: 09 432 2841 E-mail: zl1pc@nzart.org.nz | |



NZART Radio Science Education Trust

Application for Grant-in-Aid

Applications are invited from secondary school science teachers and other training providers for Grants-in-Aid from the NZART Radioscience Education Trust to promote the development of projects in the general areas of radio and/or electronics. It is anticipated that these projects will lead to entries in the local area Science and Technology Fair. Grants will not normally exceed \$250.00

Applications should normally be received no later than 30th April of the year of application. Application forms may be obtained from:

The Trustees,
NZART Radioscience Education Trust,
PO Box 1733,
Christchurch 8140,
or from <trustee@nzart.org.nz>. Applications should be endorsed by the Head of Science or, for other organisations, the President/Chairperson.

"DX" WITHOUT "TX"

For over 60 years, the NZRDXL has catered for the interests of DX listeners in New Zealand.

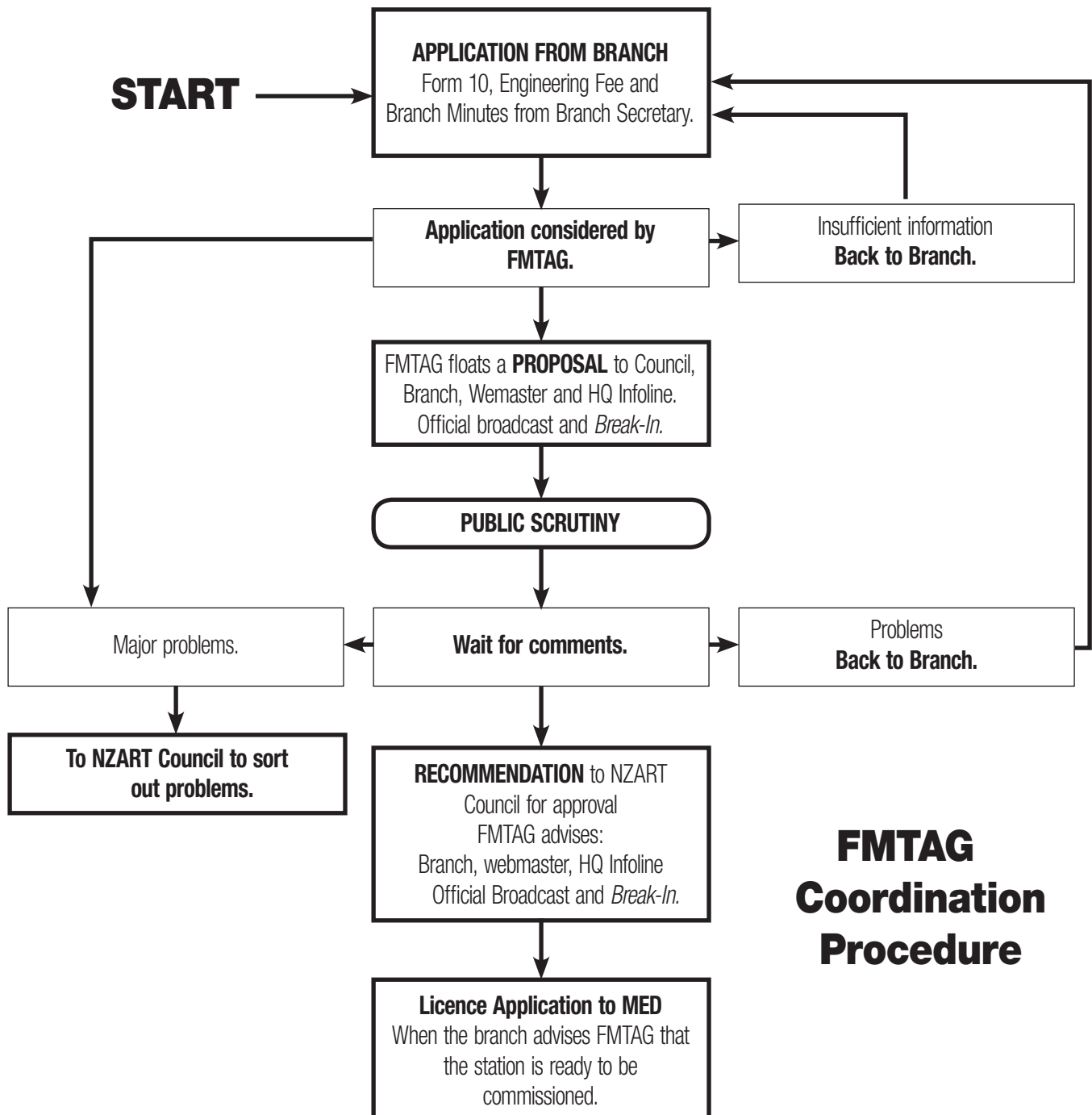
From Radio Bangui in the steamy jungles of Africa, to the haunting Andean music of Radio Huancayo, to the ever-accurate news from BBC, radio still delivers an important message.

And our monthly magazine The DX Times will tell you what's on the bands and where and when to find your DX-targets.

Whether you're a die-hard DXer, a news junkie, a stickie-beaker, or looking for an alternative to TV and the internet, you'll find people with common interests in the NZRDXL. All for as little as \$20 per year.

For more information please visit www.radiodx.com where you can download a sample DX Times or request an info-pack from:
NZRDXL, PO Box 39-956, Howick, Manukau

FMTAG PROCEDURE



FMTAG Coordination Procedure

FREQUENCY MANAGEMENT TECHNICAL ADVISORY GROUP (FMTAG)

FMTAG consists of:
Chairperson, Secretary and others as appointed by NZART Council. The purpose and actions of the FMTAG are:

- Study and report to Council on matters affecting amateur radio frequencies.
- Plan future use of amateur bands
- Select frequencies for Amateur Fixed Stations
- Maintain a register of Amateur Fixed Stations
- Assists in preparing drafts for Council including submissions when needed, to the Ministry of Economic Development (Radio Spectrum Division) on behalf of the Amateur Service prior to each major ITU meeting or conference
- Band plans are developed by the FMTAG based on IARU recommendations, local requirements, and submitted to NZART Council for approval

Application Forms for repeaters and beacons can be obtained from a NZART Councillor, NZART HQ or email your request to <fmtag@nzart.org.nz>.

Prepared by FMTAG MAY 2000



REPEATER/BEACON/LINK etc NZART FORM 10

(revised: 2010-06-01)

Please fill in the details and send by email to: fntag@nzart.org.nz

Application date: _____

Originating Branch name and number: _____

Trustees (two required) _____

Trustee 1 (also the nominated MED contact person) _____

Name: _____

Call-sign: _____

NZART membership number (on *Break-In* wrapper): _____

Phone number: _____

Email address: _____

Trustee 2 _____

Name: _____

Call-sign: _____

NZART membership number (on *Break-In* wrapper): _____

Phone number: _____

Email address: _____

Location in NZ2000 Metric Grid coordinates: _____

MED site name, or name on NZ2000 map: _____

Site ground height on NZ2000 map: _____

Desired name of station in Call Book: _____

Owner of site: _____

Owner of building housing station: _____

Are there Suppressed Records services at or near the site? (please circle) YES NO

Type of station: Amateur H _____

Voice repeater (Y/N): _____ Digipeater (Y/N): _____

Data repeater (Y/N): _____ ATV Repeater (Y/N): _____

National System repeater (Y/N): _____ STSP repeater (Y/N): _____

Beacon (Y/N): _____ Beacon call-sign requested: _____

Other (give details): _____

Band for this station: _____

Receive location: Amateur Mobile Area _____

Antenna configuration: _____

Antenna polarisation: _____

Antenna gain (dB isotropic): _____

Antenna height above ground (m): _____

Distances to other nearby antennas (m): _____

Direction(s) of maximum radiation (degrees true), or omni: _____

| | | | |
|--|-----|----------------------------|-----|
| Feeder loss (dB) or feeder type and length: | | | |
| Transmit circulator make and model number: | | | |
| Transmit Duplexer or Output Filter make and model number: | | | |
| Transmit Duplexer or Output Filter loss (dB): | | | |
| Transmit modulation mode: | | | |
| Receive Duplexer or Input Filter make and model number: | | | |
| Receive Duplexer or Input Filter loss (dB): | | | |
| Receive modulation mode: | | | |
| Make of Tx: | | Model of Tx: | |
| Make of Rx: | | Model of Rx: | |
| Transmitter output power (W): | dBW | EIRP: | dBW |
| Main Power source Mains (Y/N): | | Solar (Y/N): | |
| Other (Y/N): | | Backup power source (Y/N): | |
| Copy of minutes of Branch meeting approving construction: | | | |
| Comments and/or System diagram/description: | | | |
| | | | |
| Details checked by MED-Approved Radio Certifier/Engineer number: | | | |

*Please make payment of \$50 to NZART HQ, by cheque or to BNZ Upper Hutt: 02 0772 0209760 00
Please email FMTAG when payment has been made: fmtag@nzart.org.nz*

NOTES AND HINTS ON COMPLETING NZART FORM 10

The aforementioned version of NZART Form 10 replaces all others. Please do not use old versions. The changes since the last version were necessary to obtain the extra information required by the certifying engineer and the MED Licensing Section.

Permanent location, from InfoMap 260 series map.

The MED requires the station location to better than 100 metres accuracy. This corresponds to 2 mm on the NZ260 series map. Please ensure that any GPS unit is set to the "NZ 1949" geodetic datum option. Please see page 13 of Jan/Feb 2001 Break-In for more details. In the case of Short Term Special Purpose (STSP) repeaters, please enter the storage location.

"Suppressed Records" Government radio services.

The licence details of some Government radio services, such as Police, do not appear in the

public licence records. The MED has special licensing procedures for sites that have such services. It is helpful, and minimises delay in obtaining licences, if FMTAG is advised by the applicant, if the site is shared by, or is near to a site occupied by, a Government radio service. If possible, please identify the Government Department involved.

Antenna gain (dB isotropic).

The MED requires the (dB isotropic) antenna gain to better than 1 dB accuracy. There are two references for gain: dB isotropic (dBi) and dB dipole (dBd). There is 2.1 dB difference between these two references. FMTAG will work out the (dB isotropic) gain, if it is not known, from your description of the antenna.

Distances to other nearby antennas (m) and other technical details.

The MED requires FMTAG to calculate the likely levels of intermodulation from the inter-

station coupling. This factor includes the inter-antenna coupling, between the antennas of the existing stations and the antenna of the proposed station, and the off-frequency attenuation of the filters, duplexers, circulators, feeder loss, etc.

FMTAG can calculate the inter-station coupling from the relative orientation and distance between antennas, and the make and model of the other equipment.

Please ignore all antennas more than 10 wavelengths away, for example, more than 20 metres away at the 2-metre band. Please include all antennas for the other stations operating on frequencies between half and twice the frequency of the proposed station, for example, all antennas between 72 MHz and 296 MHz for a 2 metre station. However, please include all Amateur antennas, because of the harmonic relationship between most of the Amateur bands.

The relative antenna orientation also affects the inter-antenna coupling. A simple sketch would be useful.

Make and model number.

Home made equipment is acceptable to the MED. Please put "Amateur" followed by the surname of the constructor, in the applicable space.

However, for the protection of the Repeater Trustees, the equipment should be tested to ETS 300684, prior to being turned on. ETS 300684 is about 10 dB stricter than RFS25, for FM voice transmitters, and 10 dB stricter than RB16, for ATV transmitters. The MED requires unwanted emissions outside the Amateur bands to comply with ETS 300684.

The level of unwanted emissions is also determined by the inter-station coupling. The MED has the right to require that unwanted emissions are suppressed to a greater extent than required by ETS 300684, and to turn off a station until the necessary measures, such as additional filters or circulators, are taken to achieve this.

AUDIO-VISUAL LIBRARY

Video Tape Library

Cost of hire for each video is \$5.00 including P & P.

- 1) **All China RDF Competition**
A serious 30-minute look at Amateur Radio Direction Finding – an official sport in China.
- 2) **The Happy Flyers Techniques of RDF**
A 26-minute audio-visual presentation of the theory and techniques for VHF Radio Direction Finding.
- 3) **The Aerial Circus with Dud Charman G6CJ**
45 minutes. Verification of the theory of the operations of a variety of VHF and HF antennas. See the theory confirmed by means of scale model antennas.
- 4) **Amateur Radio's Newest Frontier**
30 minutes. A recent production from ARRL. Looks at the Radio Amateurs' involvement in space.
- 5) **NAREC 50**
A 60-minute production by Branch 25. Looks at the Napier Conference and the 50th Anniversary of AREC.
- 6) **Communications – The Hidden Revolution**
135 minutes. An address and demonstration by the Engineer-in-Chief, New Zealand Post Office, on modern communications techniques and methods.
- 7) **The Integration and Launch of AMSAT OSCAR-10**
35 minutes. A preview of the presentation and launch of OSCAR-10 by Werner Haus ZJ4KQ.
- 8) **The Wonderful Wide World of Amateur Radio**
27 minutes. Produced by JARL. A look at Amateur Radio in Japan.
- 9) **W. (Bill) Orr W6SAI Whakatane Conference Opening June 1988**
20 minutes.
- 10) **1987 Dayton Hamvention – A KGØP Production**
30 minutes.
- 11) **ARRL's New World of Amateur Radio 1988**
Via WA6AL.
- 12) **W6AI Sunday 05/06/1988**
Lecture on Linear Amplifiers.
- 13) **Component Identification – ZL1TOF**
18 minutes.
- 14) **Launch of Ariane IV 15/06/1988**
- 15) **RSGB's Amateur Radio for Beginners**
43 minutes.
- 16) **Waiting for the Big One**
- 17) **Fuji-2 JAS-1**
Japanese Amateur Satellite 1B.
- 18) **Ham Radio In Space**
30 minutes. ARRL.
- 19) **SAREX – Shuttle Amateur Radio Experiment**
19 minutes. ARRL.
- 20) **"More Than Radios" from Zman Productions**
This video is a very special message to Amateur Radio Operators. It is a strong emotional video and not like any other video you have seen about Amateur Radio.

21) Getting Started in Packet Radio

From CQ Communications Inc. This video will help demystify the exciting but sometimes confusing world of Packet Radio.

22) Dayton Hamvention 1966

Vaughan Henderson ZLITGC.

23) DXpedition May 1996 to Raoul Island – ZL8RI

24) What's Happening in ARDF

7 minutes.

25) ZL3CI – Campbell Island 1999 – James Brookes

9V1YC 60 minutes. Further copies of this can be purchased \$US25.00 plus P & P through <http://www.dxvideos.com/>.

26) An Interview with Gerald Beattie – June 21, 1989

28 minutes.

27) NZART Amateur Television Official Broadcast

March 30, 1986

28) NZART 75th Anniversary Conference

Auckland 2001

29) Commemoration at Musick Point 2003

30) ZL2AMJ Investiture at Government House August 2002

31) The Secret Wireless War (new)

120 minutes. Beyond Bletchley Park and Black Propaganda

CD-ROMS for Hire

Costs for hire of each CD-ROM is \$6.00 including

- 1) **Bell-Goyder QSO October 18, 1924**
- 2) **513A IOTA Yambe Island DXpedition, July 1-10, 2000**
- 3) **NZART 75th Anniversary Conference**
- 4) **Otago Branch History (1923–2003) 75th**
- 5) **NZ WARO History (1962–2002)**
- 6) **The Story of Enigma**
A webpage display (html and jpg files). Not recommended for Branch entertainment by projection.

ARRL Ham Software Library

- 1) **Ham Radio CD Rom 1968–1976**
- 2) **Ham Radio CD Rom 1977–1983**
- 3) **Ham Radio CD Rom 1984–1990**
- 4) **Tune in the Universe—Paul Shuch N6TX**
- 5) **Ham Shack Brass Pounders & Rag Chewers on CD**
- 6) **NZART Convention 2006 Radio Astronomy**
by Clive Rowe
- 7) **NZART Convention 2006 Time & Frequency**
by Dave Brown ZL3FJ
- 8) **NZART Convention 2006 How Sound Card Digital Modes Work** by ZL1BPU



BRANCHES AND MEMBERSHIP

A Policy Statement by Council (Revised 1996, second revision June 2005)

Members will be aware of the requirement in paragraph 7.3 of the Association Constitution that Branches must not admit to membership persons who hold an amateur station licence, but who are not members of the Association.

Over the years there have been attempts to repeal or modify these provisions, but successive National Conferences have made it quite clear that members will have none of it. The rationale for this Constitutional provision is that it provides at least one way in which non-members can be denied the privileges which membership of the Association brings. We cannot stop our non-member brethren enjoying some benefits – such as the negotiations the Association conducts with the licensing authorities, the use of repeaters, and the enjoyment of the benefits of which bandplans bring. Council is firmly of the view that it is unfair to those that do pay their subscriptions if the lot of non-members is made easier by the ready availability of member's privileges which the Association is, in fact, able to withhold. Further, the Association has to take into account the feelings of its many voluntary workers, who devote many hours to Association matters, and, in addition, pay their subscriptions as well. These persons have even greater cause to complain if the Association makes benefits available to non-members who do not contribute to these benefits by at least joining the Association and paying a subscription.

Branch Officers

It is disturbing to Council to find that some Branches not only fail to have regard to their Constitutional obligations by ensuring that licensed amateurs who are not Association members do not join the Branch. Some Branches also have as Branch Officers persons who are licensed amateurs but not members of the Association. This is clearly unconstitutional. If an Officer is not an Association member, but is a licensed amateur, then there is a breach of the Association Constitution. This

should also be a breach of the Branch Constitution – if it is not, the Branch Constitution is faulty and must be brought into line. (See the Association's Constitution – paragraph 7.3(c).)

Regrettably there are one or two branches that indulge in this fiction. The Branch attempts to evade its responsibilities to NZART, whether arising under paragraph 7.3 or otherwise, by purporting to distinguish between the local club and the NZART branch. This fiction ignores the realities, and is not acceptable. The reality is that the local club itself is the NZART branch, and the branch constitution must be changed to reflect this commitment to NZART if that is necessary. Any attempt (for that is all that it is) to circumvent the Association Constitution by resorting to this fiction is unfair to the local NZART members, other NZART members, and the Association itself.

Relationship between Branches and the Association

Sometimes, Branch members criticise these rules, often using catch phrases such as “breach of human rights”, or “interference with independent clubs”. These provisions of the Association Constitution are nothing of the sort. They are part of the contract that members make when they join the Association. By applying to become or by remaining an Association Branch, the Clubs or Branches surrender their independence to the extent required to conform to the Association's Constitution. Branches are expected to keep their houses in order; if they are not prepared to do this, then they should prepare to surrender their status as a Branch. There is nothing in the Human Rights Act to prevent the Association and its branches from discriminating between members and non-members.

Whose job is it to be the policeman?

The answer is – nobody's and everybody's. The Association's Constitution does not specifically

charge Council or any Officer with the task of enforcement. So long as we remain members, we are all parties to the contract represented by the constitution and we each individually have that responsibility. If a Branch is incorporated in its own right, then the branch in its corporate capacity also has that duty.

Hardship

Hardship is not a ground for failing to become an Association member. Association subscriptions can be remitted under paragraph 5.1(f) of the Association Constitution and Council will authorise this where there is genuine hardship. But Council's experience has been that the genuine hardship is rare indeed. Many claims of hardship over the years have been found not to be genuine. The member should initially make application to the General Secretary for this concession. If considered necessary Council might then discretely seek further information from the Branch. Council expects that there would be very few cases in the country at any one time. The privacy of the applicant is respected by ensuring that as few persons as possible within the Association are aware of the application.

In cases of hardship, subscriptions may be paid by monthly automatic payment. The applicant should discuss this option with the General Secretary.

Why are we telling you this now?

Council has never said anything else. But there are now some situations that create special problems for the Association.

The Association enters into contracts with private landowners, public corporations and State Owned Enterprises relating to right of entry to land for the siting of repeaters. These contracts recognise potential liabilities and require the Association as a condition of the contract to take public liability insurance, which could be up to \$2,000,000 or more. This insurance will be

taken on terms that will extend to protect both the Association and individual members. Naturally, the corporations we are dealing with take comfort in this insurance, as they know that while the insurance is in place the Association has the indemnities required to meet any claims. The reality is that to come within the Association's cover, individuals must be members. The Association has no intention of paying additional premiums to insure against the actions of non-members. If an individual incurs liability as agent of the Association, then that individual must be a member to take the benefit of any cover the Association arranges. The Association will not appoint non-members as its agents, as this would nullify the insurance cover.

As branches have responsibility with the Association for repeaters, Branch Officers are required to be Association members. This is no more than the Constitutional requirement. Because of these matters, Council will, in future, have to be more active in seeing that the Constitution is observed. As the appointment of repeater trustees is an Association matter, even if exercised through Branches, repeater trustees must also be members. This, likewise, is a necessary consequence of the provisions of the Constitution. Council, in future, will have to ensure that repeater trustees are Association members, not only because this is a Constitutional requirement, but also to ensure that the persons responsible for the operation of repeaters have adequate insurance cover to meet the requirements of our contracts with the public corporations.

Action

Take action now to ensure that your Branch complies with the Association Constitution. Your Councillor will help you with advice as required.

This policy statement was first published in the August 1990 Break-In. It is now reissued in a slightly revised form.

NZART Council February 1996

Second revision ZLIUD, ZLIID, ZL2BHF June 20 2005

The Constitution of the New Zealand Association of Radio Transmitters Incorporated

is available from: The Business Manager, NZART, Freepost 3565, PO Box 40-525, Upper Hutt 5140
or NZART URL: <http://www.nzart.org.nz/nzart> nzart@nzart.org.nz

NZART BRANCH DIRECTORY

Alphabetical List of Branches

| Date of update | | | Date of update | | | Date of update | | | Date of update | | |
|----------------|---|---------------------------------|----------------|----|---|-------------------------------|------|----|----------------|----------------------------|------|
| 01 | M | Ashburton | 2010 | 16 | C | Horowhenua | 2010 | 29 | N | North Shore | 2010 |
| 02 | N | Auckland | 2010 | 79 | N | <i>Howick & Districts</i> | | 52 | C | <i>Northern Hawkes Bay</i> | |
| 66 | N | Auckland VHF Group | 2010 | 17 | N | Huntly | 2010 | 73 | N | <i>Northern Wairoa</i> | |
| 84 | N | Bay of Islands | 2010 | 18 | C | Hutt Valley | 2010 | 72 | N | Opotiki | 2010 |
| 04 | N | Cambridge | 2010 | 19 | C | Inglewood | 2010 | 30 | S | Otago | 2010 |
| * | M | Canterbury (CARDS) | 2010 | 76 | M | <i>Kaikoura</i> | | 31 | C | <i>Pahiatua</i> | |
| 15 | C | <i>Central Hawkes Bay</i> | | 69 | C | Kapiti | 2010 | 65 | N | Papakura | 2010 |
| 61 | S | Central Otago | 2010 | 67 | N | Kawerau | 2010 | 54 | C | <i>Patea</i> | |
| 05 | M | Christchurch | 2010 | 20 | C | Manawatu | 2010 | 75 | S | <i>Queenstown</i> | |
| 56 | M | Christchurch West | 2010 | 59 | N | <i>Mangakino</i> | | 83 | N | Raglan | 2010 |
| 51 | N | Eastern Bay of Plenty | 2010 | 21 | N | Manukau | 2010 | 32 | C | <i>Rahotu Coastal</i> | |
| 08 | S | Eastern Southland | 2010 | 22 | C | Marlborough | 2010 | 62 | M | Reefton-Buller | 2010 |
| 09 | C | <i>Egmont</i> | | 23 | C | Marton & Districts | 2010 | 71 | N | Rodney | 2010 |
| 78 | N | Far North Districts | 2010 | 44 | N | Matamata | 2010 | 33 | N | Rotorua | 2010 |
| 70 | C | <i>Fieldding</i> | | 85 | N | <i>Mercury Bay</i> | | 34 | M | South Canterbury | 2010 |
| 10 | N | Franklin | 2010 | 24 | C | Motueka | 2010 | 35 | S | South Otago | 2010 |
| 11 | C | Gisborne | 2010 | 25 | C | Napier | 2010 | 87 | M | South Taranaki | 2010 |
| 12 | N | Hamilton | 2010 | 26 | C | Nelson | 2010 | 36 | M | <i>South Westland</i> | |
| 14 | C | <i>Hawera</i> | | 27 | C | New Plymouth | 2010 | 82 | M | Southern Wairarapa | 2010 |
| 13 | C | Hawkes Bay | 2010 | 37 | S | Southland | 2010 | 86 | M | Suburban | 2010 |
| 58 | N | <i>Helensville</i> | | 68 | M | North Canterbury | 2010 | 06 | C | Tararua | 2010 |
| 80 | N | Hibiscus Coast | 2010 | 64 | S | North Otago | 2010 | 38 | N | <i>Taumarunui</i> | |
| | | | | | | | | | | | |
| 60 | N | Taupo | 2010 | | | | | | | | |
| 39 | N | Tauranga Districts | 2010 | | | | | | | | |
| 88 | N | Tauranga ECG | 2010 | | | | | | | | |
| 77 | N | <i>Te Aroha & Districts</i> | | | | | | | | | |
| 40 | N | Te Awamutu | 2010 | | | | | | | | |
| 53 | N | Te Puke | 2010 | | | | | | | | |
| 41 | N | Thames | 2010 | | | | | | | | |
| 42 | C | Titahi Bay | 2010 | | | | | | | | |
| 57 | N | <i>Tokoroa</i> | | | | | | | | | |
| 63 | C | Upper Hutt | 2010 | | | | | | | | |
| 43 | N | Waihi & Districts | 2010 | | | | | | | | |
| 81 | N | Waikato VHF | 2010 | | | | | | | | |
| 45 | C | <i>Waimarino</i> | | | | | | | | | |
| 46 | C | Wairarapa | 2010 | | | | | | | | |
| 47 | C | Waitara | 2010 | | | | | | | | |
| 55 | N | Waitomo | 2010 | | | | | | | | |
| 48 | C | Wanganui | 2010 | | | | | | | | |
| 50 | C | Wellington | 2010 | | | | | | | | |
| 74 | C | Wellington VHF | 2010 | | | | | | | | |
| 03 | N | Western Suburbs | 2010 | | | | | | | | |
| 49 | M | Westland | 2010 | | | | | | | | |
| 28 | N | Whangarei | 2010 | | | | | | | | |

Letter after Branch number donates electoral district – N=Northern, C=Central, M=Midland, S=Southern. *Italics* = Branches in recess.

Affiliated Branches: Canterbury Amateur Radio Development Society Inc (CARDS).

01 Ashburton (Inc)

Branch Call-sign ZL3AF
 Physical Address Aviation Museum, Airport, Seafield Rd, Ashburton
 Postal Address 60 Beach Road, Hampstead, Ashburton, 7700.
 President Jim Nelson ZL3ND
 Vice President Brian Rickard ZL3TJW
 Secretary Mike Trump ZL3TPQ
 Treasurer Robin Williams ZL3REW
 Contact Person(s) Mike Trump ZL3TPQ
 Contact Ph No (03) 308-7119
 E-mail mtrump@orcon.net.nz
 Meeting Info Second Monday each month (except December and January) at 1930 hours at Clubrooms

02 Auckland (Inc)

Branch Call-sign ZL1AA
 Physical Address 400 St. Johns Road, Kohimarama, Auckland 1071.
 Located down the back of the Scarbro yard.
 Postal Address PO Box 18-003, Glen Innes, Auckland 1743.
 President Gwynne Rowe, ZL1AAR
 Vice President Peter Ellis, ZL1LS
 Secretary Wallace Bottomley ZL1WAL
 Treasurer Wallace Bottomley ZL1WAL
 Net Info 145.775 MHz repeater and on Mondays at 2000 hours and 3645 kHz on Mondays at 2100 hours
 Contact Person(s) Selwyn Ross ZL1BRC, Bob Murphy ZL1AFU
 Contact Ph No (09) 575-8847
 E-mail: z11brc@nzart.org.nz; (09) 534-5950
 z11afu@nzart.org.nz
 Meeting Info Every 3rd Saturday of the month (Feb to Nov) at 1330 hours after a midday BBQ in nice weather.
 Committee Meeting First Tuesday each month (except January) at 1930 hours.
 Web www.qsl.net/z11aa
 General Info Clubrooms open on Saturday mornings from 1000 hours for people to drop in, have a ragchew, use the club's rigs, search through the back issues of QST, or simply just have a cuppa.

03 Western Suburbs Radio Club (Inc)

Branch Call-sign ZL1AC
 Physical Address 3000 Great North Road, New Lynn, Waitakere City
 Postal Address PO Box 15-122, New Lynn, Waitakere City 0640
 President Ian Sangster ZL1RCA
 Secretary Roy Milam ZL1WI
 Net Info VHF 146.5250MHz simplex Wednesday at 1930 hours, HF 3623KHz Friday at 1930 hours
 Contact Person(s) Ross Reddell ZL1VRR
 Contact Ph No (09) 629-0504. E-mail: ross.reddell@xtra.co.nz
 Meeting Info Second Monday of each month at 1930 hours except January at club rooms
 Committee Meeting Fourth Wednesday at club rooms at 1930 hours
 Web www.qsl.net/z11ac
 General Info Branch 03 is dedicated to ATV, Contesting and AREC. The Club also runs an APRS digi, ZL1AC-1 on 144.550. Branch 03 extends a welcome to all hams to visit us on air or at the clubrooms.

04 Cambridge Radio Club

Branch Call-sign ZL1HP
 Physical Address 22a Taylor Street, Cambridge
 Postal Address Cambridge Radio Club, c/- Cambridge Community Centre, 22a Taylor St, Cambridge 3434
 President Gary Stevens ZL1TTC, E-mail: support@informatics.co.nz
 Secretary Ian Honey ZL1IAN, E-mail: ianh@waikato.ac.nz
 Treasurer Ian Honey ZL1IAN, E-mail: ianh@waikato.ac.nz
 Contact Person(s) Gary Stevens
 Contact Ph No (07) 827-6474 E-mail: support@informatics.co.nz
 Meeting Info Every Wednesday at 1930 hours, 22a Taylor St.
 Committee Meeting Last Wednesday of month, 1930 hours, 22a Taylor St.
 General Info NZART Contact: Mr. P.C. Sadgrove ZL2UJ, E-mail: z12uj@nzart.org.nz

05 Christchurch Amateur Radio Club (Inc)

Branch Call-sign ZL3AC
 Physical Address 27 Galbraith Avenue, Avonside, Christchurch
 Postal Address PO Box 1733, Christchurch 8015
 President David Holland ZL2IC
 Vice President Mike Barnes ZL3TMB
 Secretary Rory Deans ZL3HB
 Treasurer Richard Prattley ZL3UE
 Net Info Cass Peak 145.625MHz linked to Tekapo 146.800MHz on Sundays at 2000 hours (except delayed last Sunday of the month after Official Broadcast)
 Contact Person(s) Rory Deans ZL3HB
 Contact Ph No (03) 325-4181. Email: rory1@xtra.co.nz
 Meeting Info First Wednesday each month (February to December) at 1930 hours. "Social get-together & technical night" every Tuesday night 1930 hours (February to December)
 Committee Meeting Monday after monthly club meeting
 Web <http://www.nzart.org.nz/branches/chch/branch05/>
 General Info Publications: Hamlinks—contact David Holland ZL2IC

06 Taranaki District Radio Club (Inc)

Branch Call-sign ZL2IB
 Physical Address Woodville Community Centre, Ross Street, Woodville
 Postal Address 57 Cole Street, Dannevirke 4930
 President Jim Edwards ZL1UBE
 Vice President Paul Harris ZL2PFH
 Secretary Stephen Cooper ZL2WAU
 Treasurer Stephen Cooper ZL2WAU
 Net Info Every Friday Night at 2000 hours on Wharite 146.650 MHz
 Contact Person(s) Stephen Cooper ZL2WAU or Tom Fleming ZL2TF
 Contact Ph No (06) 374-8288 or (06) 376-7638
 Email rosewoodvilla@xnet.co.nz or t.j.fleming@paradise.net.nz
 Meeting Info Second Sunday of each month (except December and January) in the Supper Room at the Woodville Community Centre, Ross Street, Woodville at 1330 hours
 Web <http://www.qsl.net/zl2ib>
 General Info Charities Entity Registration Number CC35193
 Club repeaters: Wharite Voice 146.650
 Taranaki Voice/Data 145.625
 Wharite Voice/Data 439.600
 STSP Voice 146.825

08 Eastern Southland

Branch Call-sign ZL4AL
 Postal Address C/- PO Box 9, Wyndham 9849
 President Murray Giles ZL4MG
 Vice President Dick Whyte ZL4AQ
 Secretary Lindsay Eunson ZL4LC
 Treasurer Ron Falconer ZL4RMF
 Contact Person(s) Colin Robertson ZL4KJ
 Contact Ph No (03) 208-5979
 Email Lindsay.Eunson.lin.e@xtra.co.nz
 Meeting Info 3rd Wednesday of the month at 2000 hours at Latham Road Clubrooms

09 Egmont

Branch Call-sign In recess

10 Franklin Amateur Radio Club (Inc)

Branch Call-sign ZL1SA
 Physical Address Stadium Drive, Pukekohe.
 Postal Address C/- 25 John Street, Pukekohe 2120
 President Colin Shuker ZL3CJS
 Secretary Tom McDonald ZL1TO
 Net Info 3700 kHz on Sundays at 0900 and Bombay 690 on Sundays at 0930
 Contact Person(s) Bob Holt ZL1BBZ
 Contact Ph No (09) 235-9549. E-mail: zl1to@nzart.org.nz
 Meeting Info Third Tuesday each month at 2000 hours
 Committee Meeting First Tuesday each month at 1930 hours

11 Gisborne Amateur Radio Club (Inc)

Branch Call-sign ZL2AA
 Physical Address Scout Hall, Bryce Street, Gisborne
 Postal Address 34 Marian Drive, Gisborne 4010
 President Peter Omer ZL2TRG
 Vice President Rowley Haisman ZL2APH
 Secretary Ric Coleman ZL2RIC
 Treasurer Douglas Birt ZL1BFS
 Net Info 146.900 MHz every Sunday from 2100 hours
 Contact Person(s) Ric Coleman
 Contact Ph No (06) 868-4721 or 021-2140624
 Email ricol@xtra.co.nz
 Meeting Info General meeting second Monday each month (excluding public holidays) at 1900 hours.
 Committee Meeting Committee meets as per monthly arrangements.
 Web <http://ZL2AA.OnNZ.net/>
 General Info IRLP Node 6105. Gisborne. New Zealand

12 Hamilton Amateur Radio Club (Inc)

Branch Call-sign ZL1UX
 Physical Address 88 Seddon Road, Hamilton.
 Postal Address PO Box 606, Waikato Mail Centre, Hamilton 3240
 President Robin Holdsworth ZL1IC
 Secretary David Nation ZL1TCE and Phil King ZL1PK
 Net Info 3575 kHz on Mondays at 1930 hours and 146.525 MHz FM simplex on Tuesdays at 2000 hours
 Contact Person(s) Phil King ZL1PK
 Contact Ph No Phil King (07) 847-1320 or Gavin Petrie (07) 843-0326
 Email branch.12@nzart.org.nz
 Meeting Info General Meeting third Wednesday of each month (except December) at 1930 hours at the clubrooms
 Committee Meeting Executive Meeting first Wednesday (except January) at 1930 hours at the clubrooms
 Web <http://zl1ux.tripod.com>
 General Info Annual Market Day in mid August each year

13 Hawkes Bay Amateur Radio Club

Branch Call-sign ZL2AS and ZL2QS
 Physical Address Surf Lifesaving Club Rooms, Windsor Park, Grove Road, Hastings
 Postal Address C/- PO Box 2403, Stortford Lodge, Hastings 4153
 President Warren Harris ZL2AJ
 Secretary David Walker ZL2DW
 Net Info 3615 kHz and 147.250 MHz Repeater on Sundays at 0900 hours
 Contact Person(s) Warren Harris ZL2AJ
 Contact Ph No 0800 219 284
 E-mail warren@technaserve.com or david@apexradiocom.co.nz
 Meeting Info Fourth Wednesday each month (except December) at 1900 hours at Surf Lifesaving Club Rooms, Grove Road, Hastings (Splash Planet car park)

14 Hawera Amateur Radio Club

Branch Call-sign In recess, absorbed into South Taranaki, Branch 87

15 Central Hawkes Bay

Branch Call-sign In Recess

16 Horowhenua

Branch Call-sign ZL2DS
 Postal Address C/- 2 Oslo Place, Levin
 President Kenneth Ireland ZL2KI
 Secretary Steve Jepson ZL2KG
 Net Info 3720 kHz on Wednesdays at 2030 hours and 147.575 Simplex on Sundays at 0900 hours
 Contact Person(s) Kenneth Ireland ZL2KI
 Contact Ph No (027) 444-9449
 E-mail br16nzart@gmail.com
 Meeting Info Third Monday of Every Second month (same as Break-In) at 1930 hours

17 Huntly Radio Club

Branch Call-sign ZL1BL
 Physical Address 520 Kainui Road, Taupiri
 Postal Address 195 Rotongaro Road, RD 2 Huntly 3772
 President Terry East ZL1BGS
 Secretary Jim Williams ZL1BOS
 Contact Person(s) Terry East
 Contact Ph No (07) 826-6730 or (07) 824-6805
 Email granteast1@thenet.net.nz
 Meeting Info Fourth Tuesday at 1930 hours at 520 Kaunui Rd. Taupiri

18 Hutt Valley (Inc)

Branch Call-sign ZL2HV
 Physical Address Off Birch St, Philip Evans Reserve, Waterloo, Lower Hutt
 Postal Address PO Box 30-519, Lower Hutt, 5040
 President Barry Warner ZL2HO
 Secretary Chris Purcell ZL2POS
 Net Info 3675 kHz on Sundays at 0900
 Contact Person(s) President Barry Warner ZL2HO
 Contact Ph No (04) 566-5829
 Email warnerba@xtra.co.nz
 Meeting Info First Monday each month at 1930 (except for June which is on 2nd Monday for AGM). Also every Friday at 1930 (informal)
 Web <http://www.zl2hv.wellington.net.nz>

19 Inglewood

Branch Call-sign ZL2PT
 Physical Address 34 James St., Inglewood 4330
 Postal Address 1778 Mountain Road, RD 10, Inglewood 4390
 President Peter Cramer ZL2AIS
 Secretary Tarry Martin ZL2KV
 Net Info As required
 Contact Person(s) Peter Cramer ZL2AIS
 Contact Ph No (06) 756-7314
 Meeting Info As Required

20 Manawatu Amateur Radio Society (Inc)

Branch Call-sign ZL2KO
 Physical Address 65 Totara Road, Palmerston North 4412
 Postal Address PO Box 1718, Palmerston North 4440
 President Richard Prior ZL2KP
 Vice President Chester Clark ZL2AFJ
 Secretary Cheryl Wheatley ZL2VCC
 Treasurer Pete Moore ZL2AUB
 Net Info 3570 kHz on Sundays at 0900 hours and 147.125 MHz on Thursdays at 2000 hours
 Contact Person(s) Stan Russell ZL2BRS
 Contact Ph No (06) 358-6683 or Email: stanruss@inspire.net.nz
 Meeting Info First Wednesday each month at 1930 hours, fourth Wednesday 1400 for "Old Timers Social "natta session" between March and October.
 Committee Meeting Third Wednesday at 1930 hours
 Web <http://zl2ko.org.nz/>

21 Manukau

Branch Call-sign ZL1QB
 Physical Address 8 Guide Place, Papatoetoe, Manukau 2025
 Postal Address 8 Guide Place, Papatoetoe, Manukau 2025
 President Jim Paltridge ZL1JW
 Secretary Terry Rist ZL1TR
 Net Info 3655 kHz and 146.550 MHz on Sundays at 0900 hours
 Contact Person(s) Terry Rist ZL1TR
 Contact Ph No (09) 259-9677
 E-mail risty@vodafone.co.nz
 Meeting Info Third Wednesday each month at 1930 hours. Day meeting first Monday each month at 1015 hours.
 Committee Meeting Combined with General Meeting

22 Marlborough Amateur Radio Club (Inc)

Branch Call-sign ZL2KS
 Physical Address Marlborough EOC, Wither Road (West Extension) Blenheim
 Postal Address PO Box 432, Blenheim 7315
 President Stuart Watchman ZL2TW
 Secretary Tony Allan ZL2DOG
 Net Info Blenheim 146.950, 145.600 and 147.225 on Mondays at 1930 hours, 144.150 USB on Wednesdays at 1930 hours and 3.575 MHz on Fridays at 1930 hours
 Contact Person(s) Tony Allan ZL2DOG
 Contact Ph No (03) 579-3136
 E-mail zl2ks@nzart.org.nz
 Meeting Info Second Thursday of each month, Social Group third Thursday of each month
 Committee Meeting Third Thursday of each month
 Web www.zl2ks.com

23 Marton and Districts (Inc)

Branch Call-sign ZL2AMS
 Physical Address 7A Humphrey St., Marton 4710
 Postal Address 7A Humphrey St., Marton 4710
 President Mike Beer ZL2TMB
 Secretary Joe Reed ZL2AH
 Net Info Taihape 6775 repeater on Sundays at 2000 hours
 Contact Person(s) Mike Beer ZL2TMB
 Contact Ph No (06) 327-6611
 Meeting Info At members homes. Contact secretary for details

24 Motueka (Inc)

Branch Call-sign ZL2GK
 Physical Address S.A.R. room, Motueka Police Station, High Street
 Postal Address PO Box 218, Motueka 7143
 President Barry Davenport ZL2LN
 Vice President Steve Fogerty ZL2ASF
 Secretary Doug Anderson ZL2DJA
 Treasurer Doug Anderson ZL2DJA
 Contact Person(s) Steve Fogerty ZL2ASF
 Contact Ph No (03) 528-9366
 Meeting Info First Monday each month 1930 hours at SAR room, Motueka Police Station (Check with contact person)

25 Napier Amateur Radio Club (Inc)

Branch Call-sign ZL2GT
 Physical Address 123 Latham Street, Marewa, Napier 4001
 Postal Address 54A Auckland Road, Greenmeadows, Napier 4112
 President Laurie Winton ZL2TC
 Secretary Stan White ZL2ST
 Net Info 3615 kHz and Napier 7250 on Sundays at 0900 hours.
 Contact Person(s) Laurie Winton ZL2TC
 Contact Ph No (06) 843-8519
 Meeting Info First Wednesday each month at 1930 hours at Clubrooms (except January)

26 Nelson Amateur Radio Club

Branch Call-sign ZL2ARG
 Postal Address PO Box 414, Nelson 7040
 President Brian Houghton ZL3BCO (03) 545-7096
 Vice President Paul Moffatt ZL2PO (03) 545 -0962
 Secretary Peter Thomson ZL2PHS (03) 547 0066
 Email: phsam@ihug.co.n
 Treasurer Peter Thomson ZL2PHS (03) 547 0066
 Email: phsam@ihug.co.n
 Net Info Sundays 3890 kHz at 0900 hours
 Contact Person(s) Brian Houghton ZL3BCO
 E-mail: zl3bco@gmail.com
 David Scott ZL2BCA
 E-mail nelsonsound@xtra.co.nz
 Contact Ph No Brian (03) 545-7096 / David (03) 545-0237 Section Leader
 Meeting Info Third Wednesday (Feb to Nov) at 1930 hours in the Nelson Car Club rooms, Bolt Road, Tahunanui, Nelson
 Committee Meeting First Wednesday of the month. Venue: Committee Members Homes
 Web http://www.nzart.org.nz/nzart/branches/nelson/About_us.htm
 General Info Enquiries about amateur radio examinations and assistance with tuition call Dave ZL2BCA or Topsy ZL2LS (03)545 0237 or David Cell 027 446 4714. Topsy Cell 0274 851 295 E-mail: nelsonsound@xtra.co.nz

27 New Plymouth Amateur Radio Club (Inc)

Branch Call-sign ZL2AB
 Physical Address Taranaki Emergency Management Office, 45 Robe Street, New Plymouth
 Postal Address C/- Taranaki Emergency Management Office, 45 Robe Street, New Plymouth 4310
 President Frank Hunt ZL2BR
 Vice President Greg Banks ZL2BZH
 Secretary Graeme Jury ZL2APV
 Treasurer Barrie Vivian ZL2LA
 Net Info Wednesday at 2000 hours on 147.200 MHz repeater
 Contact Person(s) Greg Banks (06) 751-3271 or Roy Symon
 E-mail zl2kh@xtra.co.nz
 Contact Ph No (06) 751-3271
 Meeting Info Third Tuesday (February to November) second Tuesday in December

28 Whangarei Amateur Radio Club (Inc)

Branch Call-sign ZL1AM
 Physical Address Kiwi North, 500 State Highway 14, Maunu, Whangarei
 Postal Address PO Box 10-078, Te Mai, Whangarei 0143
 President Brian Winger ZL1BSW
 Secretary Allan Walker ZL1AW
 Net Info VHF 146.650 MHz on Mondays at 2000 hours. HF 3585 kHz on Sundays at 0800 hours. CW Improvers: 3580 kHz on Tuesdays at 2000.
 Contact Person(s) Allan Walker ZL1AW
 Contact Ph No (09) 435-1413
 E-mail abwalker@actrix.co.nz
 Meeting Info First Wednesday each month at 1930 hours. Informal gatherings at the clubroom every Wednesday at 1700 hours

29 North Shore Amateur Radio Club (Inc)

Branch Call-sign ZL1AB
 Physical Address Civil Defence HQ, 400 East Coast Road, Sunnynook, North Shore
 Postal Address CD HQ, 400 East Coast Road, Sunnynook, North Shore 0630
 President Vaughan Henderson ZL1TGC
 Vice President Julian Dukes ZL1ABX
 Secretary Alan Wooller ZL1AUW
 Treasurer Mike Cumin ZL1CCD
 Net Info 147.425 MHz on Wednesdays at 1930 hours
 Contact Person(s) Vaughan Henderson ZL1TGC
 Contact Ph No (09) 418-1071, E-mail: vaughanh@www.co.nz
 Meeting Info First Monday in the month (except June-2nd Monday).
 Committee Meeting 3rd Monday in the month (except December)
 Web <http://www.zl1ab.110mb.com/>

30 Otago (Inc)

Branch Call-sign ZL4AA
 Physical Address 109 Macandrew Road, South Dunedin, Dunedin
 Postal Address PO Box 5485, Moray Place, Dunedin 9058
 President Alan Wilden ZL4FM
 Secretary Dave Howell ZL4TAQ
 Net Info Dunedin 690 each Sunday at 1930 hours (except Christmas/New Year period), 3613kHz each Sunday at 2000 hours.
 Contact Person(s) Dave Howell ZL4TAQ
 Contact Ph No (03) 488-5488
 E-mail davanniewhowell@xtra.co.nz
 Meeting Info Each Wednesday (except late December and early January) at 1930 hours
 Committee Meeting Second Wednesday of the month at 1930 hours
 Web www.zl4aa.org.nz
 General Info Inaugural meeting 9th August 1928

31 Pahiatua

Branch Call-sign In Recess, refer to Branch 06

32 Rahotu Coastal Inc Opunake Radio Club

Branch Call-sign In recess, absorbed into South Taranaki, Branch 87

33 Rotorua Amateur Radio Club (Inc)

Branch Call-sign ZL1ROT
 Physical Address Rotorua Watersports Centre, 1 Mataiwhera Street, Rotorua 3010
 Postal Address PO Box 6194, Whakarewarewa, Rotorua 3043
 President Rene de Wit ZL1RDW
 Secretary James Comber ZL1BWC
 Treasurer Margaret Bretherton ZL1MB
 Contact Person(s) James Comber ZL1BWC
 Contact Ph No (07) 347-8265
 Email james.comber@slingshot.co.nz
 Meeting Info General Meeting 3rd Tuesday each month, Technical Meeting 1st Tuesday each month at 1930 hours

34 South Canterbury

Branch Call-sign ZL3UR
 Physical Address Model Engineers clubrooms, corner Rose and Catherine Streets, Timaru
 Postal Address C/- PO Box 261 Timaru
 President James O'Hare ZL3JH
 Secretary David Hetherington ZL3UDH
 Net Info Timaru 6625 on Wednesdays at 1500 hours
 Contact Person(s) David Hetherington ZL3UDH
 Contact Ph No (03) 688-3619
 E-mail zl3udh@nzart.org.nz
 Meeting Info Last Monday of each month (except December) at 1930 hours

35 South Otago

Branch Call-sign ZL4JF
 Physical Address Main South Road, Balclutha.
 Postal Address C/- Cliff Gray, Stony Creek RD 2, Balclutha 9272
 President Ron Blair ZL4TL
 Secretary Cliff Gray ZL4AS
 Net Info 3585 kHz on Mondays at 2030 hours and Kuriwao 675 on Mondays at 1930 hours
 Contact Person(s) Cliff Gray ZL4AS
 E-mail zl4as@nzart.org.nz
 Contact Ph No (03) 418-1488
 Meeting Info First Tuesday of even months, plus March and November at 2000 hours

36 South Westland

Branch Call-sign In recess

37 New Zealand Association of Radio Transmitters Southland (Inc)

Branch Call-sign ZL4GQ
 Physical Address 249 Ettrick Street, Invercargill
 Phone (03) 218-8686
 Postal Address PO Box 1260, Invercargill 9840
 President Bill Obers ZL3TPE
 Secretary Michael Bailey ZL4OM
 Treasurer John Willoughby ZL4FV
 Net Info 145.775MHz and 146.800MHz on Sunday at 2000 hours
 Contact Person(s) Bill Obers ZL3TPE
 Contact Ph No (03) 215-9765 or (027) 432-1776
 E-mail president@zl4gq.com
 Meeting Info Second Tuesday of each month (except January) at 1930 hours
 General Info AREC Meeting 1st Tuesday of each month at 1930 hours

38 Taumarunui

Branch Call-sign In Recess

39 Tauranga Districts Amateur Radio Club (Inc)

Branch Call-sign ZL1TP
 Physical Address Tauranga Coast Guard HQ, Sulphur Point Marina, Tauranga
 Postal Address 223C Waihi Rd, Tauranga 3110
 President Neill Ellis ZL1TAJ
 Vice President Brian Heywood ZL1IE
 Secretary Tim Morris ZL1BJJ (07) 577-6845
 E-mail: zl1bjj@hotmail.com
 Treasurer Tim Morris ZL1BJJ
 Net Info 438.850 MHz on Monday at 0900 hours.
 Contact Person(s) Brian Heywood ZL1IE
 Contact Ph No (07) 543-3677
 E-mail zl1ie@nzart.org.nz
 Meeting Info Second Thursday each month (except January) at 1930 hours at Coast Guard Headquarters
 General Info Repeaters on 680 & 885

40 Te Awamutu Amateur Radio Club

Branch Call-sign ZL1CB
 Physical Address 550 Kane St., Pirongia 3802
 Postal Address C/- 550 Kane St., Pirongia 3802
 President Bernard Westerbaan ZL1WT, 38 Whittaker Street, Kihikihi 3800
 Secretary Biny Owen ZL2AZY, 550 Kane St, Pirongia 3802
 Net Info 3760+/- kHz on Thursdays at 2000 hours
 Contact Person(s) Bernard Westerbaan ZL1WT or Biny Owen ZL2AZY
 Contact Ph No (07) 871-7039 or (07) 871-9992
 Email z1wt@xtra.co.nz
 Meeting Info Third Wednesday every 2nd month

41 Thames

Branch Call-sign ZL1DF
 Physical Address 146 Maramarahi Road, RD1, Thames
 Postal Address 146 Maramarahi Road, RD1, Thames
 President Ken Hayhurst ZL1ATU
 Vice President John Halden ZL1ALA
 Secretary David Kitchen ZL1CDJ
 Net Info 3850kHz and 145.700 MHz on Sundays at 0900 hours.
 Contact Person(s) Ken Hayhurst ZL1ATU
 Contact Ph No (07) 868-7330
 E-mail k.hayhurst@xtra.co.nz
 Meeting Info Quarterly 2nd Tuesday (February, May, August, and November) at Thames Civil Defence Rooms, Mackey Street, Thames

42 Titahi Bay Amateur Radio Club (Inc)

Branch Call-sign ZL2AFV
 Physical Address Tireti Hall, corner Tireti Road and TePene Avenue, Titahi
 Postal Address PO Box 50-402, Porirua 5240
 President Ken Pattle ZL2TKY
 Secretary Don Robertson ZL2TYR
 Treasurer Ross Pedder ZL2UAC
 Net Info 3710 kHz on Sundays at 2000 hours
 Contact Person(s) Don Robertson ZL2TYR
 Contact Ph No (04) 234-1556
 E-mail z12afv@hotmail.com
 Meeting Info First Tuesday most months at 1930 hours, (ring contact to check)
 Committee Meeting February and July

43 Waihi and Districts

Branch Call-sign ZL1QW
 Postal Address Mr D McGuire, 14 Snell Crescent, Waihi Beach 3611
 President E. A. Pooley ZL1KV
 Vice President R J Boggiss ZL1RB
 Secretary D. McGuire ZL3DM
 Treasurer D. McGuire ZL3DM
 Contact Person(s) D. McGuire ZL3DM
 Contact Ph No (07) 863-5484
 Meeting Info First Saturday, February, April, May, July, Sept, Nov. at 1230 hrs for lunch, meeting at 1300. Ring Secretary for location

44 Matamata Radio Club

Branch Call-sign ZL1RF
 Physical Address 65 Smith Street, Matamata
 Postal Address 65 Smith Street, Matamata 3400
 Contact Person(s) John Rasmussen ZL1AGA
 Contact Ph No (07) 888-8269 (Night)

45 Waimarino

Branch Call-sign In recess

46 Wairarapa Amateur Radio Club (Inc)

Branch Call-sign ZL2OA
 Physical Address Hood Aerodrome, Manaia Road, Masterton
 Postal Address PO Box 860, Masterton 5840
 President Robert Lambert ZL2BFY
 Secretary Paul London ZL2BEF
 Net Info Masterton 680 on Mondays at 2000 hours except meeting nights
 Contact Person(s) Paul London ZL2BEF
 Contact Ph No (06) 378-2388
 E-mail branch46@gmail.com
 Meeting Info Second Monday each month (except January) at 1930 hours

47 Waitara Amateur Radio Club

Branch Call-sign ZL2TO
 Physical Address Manukorihi Park Sports Club, Manukorihi Road, Waitara
 Postal Address C/- L Smart 48 Leslie St., Waitara 4656
 President Ian Cash ZL2BRA
 Secretary Larry Smart ZL2SM
 Contact Person(s) Larry Smart ZL2SM
 Contact Ph No (06) 754-7583
 Meeting Info First Sunday each month (except January). Where a Statutory Holiday falls on a Monday the meeting is deferred one week

48 Wanganui Amateur Radio Society (Inc)

Branch Call-sign ZL2JA
 Physical Address Stalkers and Hunters Hall, 100 Peat Street, Wanganui
 Postal Address 1 Caversham Rd., Westmere, Wanganui 4501
 President Ivan Horn ZL2ATU
 Secretary Barry Stewart ZL2RR
 Treasurer Barry Stewart ZL2RR
 Net Info Each Tuesday 2000 hours on 146.900 MHz (Wanganui 690)
 Contact Person(s) Ivan Horn ZL2ATU
 Contact Ph No (06) 343 6979
 E-mail loobie@kol.co.nz
 Meeting Info First non-public holiday Monday each month (except January and July) at 1930 hours

49 Westland

Branch Call-sign ZL3GY
 Postal Address 37 Chapel Street, Greymouth
 President Bob McQuarrie ZL3TY
 Secretary Graham Hay ZL3WMM
 Net Info Westland 695 to contact club members
 Contact Person(s) Graham Hay ZL3WMM
 Contact Ph No (03) 768-9499
 E-mail z13wmm@nzart.org.nz
 Meeting Info First Wednesday each month (except January) at 1930 hours. Meeting held at Electronet Services, Tainui St. Building, Greymouth

50 Wellington Amateur Radio Club (Inc)

Branch Call-sign ZL2WB
 Physical Address WEMO Building, corner Murphy and Turnbull Streets, Thorndon, Wellington
 Postal Address PO Box 6464, Marion Square, Wellington 6035
 President Chairman: David Parish ZL4TAC
 Secretary John Andrews ZL2HD
 Treasurer Andrew Goldie ZL2ACG
 Net Info 7050 kHz on Sundays at 0930 hours
 Contact Person(s) Tony Fletcher ZL2ALJ
 Contact Ph No (04) 383-8838
 E-mail z12alj@paradise.net.nz
 Meeting Info Third Tuesday each month (except December) at 1930 hours
 Web sites.google.com/site/warc50
 General Info Information on Quartz Hill Contest Station ZL6QH see www.zl6qh.com

51 Eastern Bay of Plenty

Branch Call-sign ZL1WK
 Physical Address Waiewe Street, Hillcrest, Whakatane
 Postal Address C/- Bevan Schwass, 24 Mokorua Grove, Whakatane 3120
 President Murray Evans ZL1SZ
 Secretary Bevan Schwass ZL1MJ
 Treasurer Harry C Webber ZL1BCW
 Contact Person(s) Murray Evans ZL1SZ
 Contact Ph No (07) 308-8409
 E-mail BevanSchwass@xtra.co.nz
 Meeting Info Second Wednesday each month (except January) at 1930 hours
 Web http://www.zl1wk.yolasite.com/

52 Northern Hawkes Bay

Branch Call-sign In recess

53 Te Puke Amateur Radio Club (Inc)

Branch Call-sign ZL1IB
 Physical Address C/- Te Puke Holiday Park, 2122 State Highway 2, Te Puke
 Postal Address C/- S.J. Rowe, 223 State Highway 33, RD 9, Te Puke 3189
 President Neill Ellis ZL1TAJ
 Secretary Syd Rowe ZL1LWR
 Treasurer Syd Rowe ZL1LWR
 Net Info 3690 kHz at 0830 hours on Sundays, 144.715MHz and 438.850 MHz on Mondays at 0900 hours
 Contact Person(s) Syd Rowe
 Contact Ph No (07) 533-1029
 Email syd.rowe@xtra.co.nz
 Meeting Info 2nd Saturday each month at 1330 hours
 General Info Clubrooms open every Saturday at 1330 hours

54 Patea

Branch Call-sign In recess, absorbed into South Taranaki, Branch 87

55 Waitomo Radio Club

Branch Call-sign ZL1IZ
 Physical Address Thomson Avenue, Otorohanga
 Postal Address C/- 3/49 Hinewai Street, Otorohanga 3900
 President Andrew Leadey ZL4SQ
 Secretary Ihian Howitt ZL1BZ
 Net Info Waitomo 7375 on Sundays at 0900 hours
 Contact Person(s) Ihian Howitt ZL1BZ
 Contact Ph No (07) 873-7349
 E-mail ihian@clear.net.nz
 Meeting Info At members homes, contact Secretary for details

56 Christchurch West Amateur Radio Club (Inc)

Branch Call-sign ZL3VV
 Physical Address Auburn Park, Upper Riccarton
 Postal Address C/- PO Box 31-095, Ilam, Christchurch 8444
 President Keith Stanton ZL3QH
 Vice President Maurice McNab ZL3MEM
 Secretary Doug Pratt ZL2BCF
 Treasurer Peter Tyerman ZL3IA
 Net Info Cass Peak 145.625MHz linked to Tekapo 146.800MHz on Sundays at 2000 hours (except delayed last Sunday of the month after Official Broadcast)
 Contact Person(s) John Walker ZL3IB
 Contact Ph No (03) 348-9084
 E-mail john.zl3ib@ihug.co.nz
 Meeting Info Fourth Tuesday of each month (except December) at 1930 hours. "Free n Easy" second Wednesday each month (except January) at 1330 hours
 Committee Meeting 3rd Tuesday of each month at 1930 hours
 Web www.radioamateurs.org.nz

57 Tokoroa

Branch Call-sign In recess

58 Helensville

Branch Call-sign In recess

59 Mangakino

Branch Call-sign In recess

60 Taupo Amateur Radio Club

Branch Call-sign ZL1BCO
 Physical Address Hickling Park, A.C. Baths Avenue, Taupo
 Postal Address C/- PO Box 58, Taupo 3351
 President Kelvin Brooking ZL1KU
 Vice President Roger Simmonds ZL1UTW
 Secretary Graeme Frederick ZL1BU
 Treasurer Peter Aurisch ZL2UEW
 Net Info Taupo 675 on Mondays at 2000 hours
 Contact Person(s) Graeme Frederick ZL1BU
 Contact Ph No (07) 378-0553. Cell 021 295 6023
 E-mail zl1bu@reap.org.nz
 Meeting Info First Thursday of each month at 1930 hours at Club Rooms
 Web www.reap.org.nz/~zl1bco/

61 Central Otago

Branch Call-sign ZL4OO
 Physical Address Alexandra Fire Station
 Postal Address C/- Brian Skeet, 329 Dunstan Road, 1 RD, Alexandra 9391
 President John Lochhead ZL4QS
 Secretary Brian Skeet ZL4PN
 Contact Person(s) Brian Skeet ZL4PN
 Contact Ph No (03) 448-7245
 Meeting Info Fourth Thursday each month (except June, July and December) at 2000 hours at Alexandra Fire Station

62 Reefton-Buller

Branch Call-sign ZL3BRC
 Postal Address 33 Torea St., Granity 7823
 Secretary Ron Jenkins ZL3AWX
 Contact Person(s) Ron Jenkins ZL3AWX
 Contact Ph No (03) 782-8672
 Meeting Info 2 monthly meeting--telephone Contact Person for date and venue

63 Upper Hutt (Inc)

Branch Call-sign ZL2VH
 Physical Address Rural Fire Station, Park Street, Upper Hutt
 Postal Address c/o Peter Moore, 190 Plateau Road, The Plateau, Upper Hutt 5018
 President Mark Gooding ZL2UFI
 Vice President Mark Wolstenholme ZL2WOL
 Secretary Peter Moore ZL2HM
 Treasurer Gavin Smith ZL2ACT
 Net Info 3715 kHz Tuesdays 2000 hours UTC
 Contact Person(s) Mark Gooding ZL2UFI
 Contact Ph No (04) 526-8446
 E-mail mark@foxtrot.co.nz
 Meeting Info Every Friday night at 1930 hours NZT
 Committee Meeting As required
 Web www.zl2vh.org.nz
 General Info IRLP Node 6931 on Clime 730, IRLP Node 6962 on Clime 860

64 North Otago

Branch Call-sign ZL4OU
 Physical Address Civil Defence Headquarters, Severn Street, Oamaru
 Postal Address Branch 64, 18A Arun Street, Oamaru 9400
 President Neil McLeod ZL4SN
 Vice President Daniel Lewis ZL4DL
 Secretary Gary Millar ZL4TA
 Treasurer Denis Browne ZL4DB
 Net Info 3890 kHz Wednesdays at 2000 hours
 Contact Person(s) Alan Naish ZL4RB
 Contact Ph No (03) 434-6363
 E-mail naishs@callsouth.net.nz
 Meeting Info Second Monday each month (except January) at 1930 hours, Civil Defence Headquarters, Severn Street
 General Info Repeater Trustees: Neil McLeod, Denis Browne, Daniel Lewis.

65 Papakura Radio Club (Inc)

Branch Call-sign ZL1VK
 Physical Address Wellington Park, 1R Great South Road, Papakura
 Postal Address PO Box 72397, Papakura 2244
 President Richard Gamble ZL1BNQ
 Vice President Fred Vermeulen ZL1FAV
 Secretary Ian Ashley ZL1AOX
 Treasurer David Wilkins ZL1MR
 Net Info 147.325 MHz on Sundays at 0830 hours and 3755 kHz on Sundays at 0900 hours
 Contact Person(s) David Karrasch ZL1DK
 Contact Ph No (09) 296-3180 or (09) 296-8264
 E-mail prc@ihug.co.nz
 Meeting Info General Meeting first Wednesday each month at 1930 hours. Projects evening second & fourth Wednesday at 1930 hours. Day meeting fourth Wednesday at 1330 hours. Any 5th Wednesday AREC meeting on any 5th Wednesday at 1930
 Committee Meeting Third Wednesday of each month at 1930.
 Web www.qsl.net/zl1vk. Remote HF Station ZL1CLUB
 www.qsl.net/zl1club
 General Info Morse Examination administrator: Dave Johnston ZL1AMN (09) 298-9297

66 Auckland VHF Group (Inc)

Branch Call-sign ZL1BQ
 Physical Address Arthur Faulkner Reserve, Hazel Avenue, Mt Roskill, Auckland
 Postal Address AKL VHF Group Inc, PO Box 10138, Dominion Road, Auckland 1030
 President John Dunn ZL1JD
 Vice President Jim Meachen ZL2BHF
 Secretary Marlene Mathews
 Treasurer Doug Cooke ZL1TTE
 Net Info 146.625 and 439.875 repeaters, Sundays 2015 hours
 Contact Person(s) John Dunn ZL1JD
 Contact Ph No (09) 473-9514
 Email john.dunn@clear.net.nz
 Meeting Info Second Monday of the month at 1930 hours
 Committee Meeting Last Monday of the month, 1930 hours at the clubrooms. AGM November
 Web www.qsl.net/zl1bq
 General Info Monthly Journal: Spectrum

67 Kawerau Amateur Radio Club

Branch Call-sign ZL1KW
 Physical Address Meetings held in members homes, confirm venue with Secretary
 Postal Address C/- 34 Cobham Drive, Kawerau 3127
 President Barry Liddle ZL1CAY
 Secretary Bev Osborne ZL1IOS
 Net Info 147.900MHz every Tuesday at 1930 hours
 Contact Person(s) Bob Krause ZL1TMK
 Contact Ph No (07) 323-8560
 E-mail rkrause@xtra.co.nz
 Meeting Info Third Tuesday each month in members homes at 1930 hours. Confirm venue with Secretary at (07) 323-7515

68 North Canterbury Amateur Radio Club (Inc)

Branch Call-sign ZL3RR
 Physical Address Woodend Lions Youth Centre
 Postal Address PO Box 14, Woodend 7641, North Canterbury
 President Tony Buckland ZL3HAM
 Secretary Colin Rowe ZL3COL
 Net Info Cass Peak 145.625MHz linked to Tekapo 146.800MHz on Sundays at 2000 hours (except delayed last Sunday of the month after Official Broadcast)
 Contact Person(s) Colin Rowe ZL3COL
 Contact Ph No (03) 313-2303
 E-mail colingr@xtra.co.nz
 Meeting Info Second Thursday of each month (except January) at 1930 hours
 General Info Monthly Newsletter: "Ragchew"

69 Kapiti Amateur Radio Society (Inc)

Branch Call-sign ZL2KB
 Physical Address Cnr Aorangi Road and Tutanekei Street, Paraparaumu
 Postal Address PO Box 81, Paraparaumu 5254
 President Max Kempson ZL4VV
 Vice President Kevin Henderson ZL2DUS
 Secretary Dave Chapman ZL2DWC
 Treasurer Dave Chapman ZL2DWC
 Net Info Kapiti 146.85 MHz on Sundays at 1930 hours.
 Contact Person(s) Dave Chapman ZL2DWC
 Contact Ph No (04) 298-7252 or mobile (027) 443-3095
 E-mail dave@kennel.co.nz
 Meeting Info Second Wednesday each month at 1930 hours. Clubrooms open every Saturday from 0930 hours until 1030 hours.
 Committee Meeting Third Wednesday at 1930 hours
 General Info Very small group of active amateurs, always pleased to meet other operators even if no longer transmitting. There is always a cuppa available on Saturday morning at the clubrooms. If travelling to or staying on the coast, let Dave know, we will meet you.

70 Fielding Radio Club

Branch Call-sign In recess

71 Rodney Amateur Radio Club (Inc)

Branch Call-sign ZL1ROD
 Physical Address Mahurangi Technical Institute, 11 Glenmore Drive, Warkworth
 Postal Address PO Box 587 Warkworth 0941
 President Cec Tunnicliffe ZL2BCB
 Secretary Alan Dale ZL1ABL
 Net Info VHF 147.300 MHz Thursdays at 1930 hours
 Contact Person(s) Cec Tunnicliffe ZL2BCB
 Contact Ph No (09) 425-4295
 Meeting Info Second Saturday each month at 1000 hours (except December First Saturday, January no meeting) at the Mahurangi Technical Institute

72 Opatiki Amateur Radio Club (Inc)

Branch Call-sign ZL1BY
 Postal Address C/- 138 Wellington Street, Opatiki 3092
 President Jim Jones ZL1JRJ
 Secretary Jane Lake ZL1ONE
 Contact Person(s) Steve Winder ZL1ACE
 Contact Ph No (07) 315-7333
 E-mail zl1ace@wave.co.nz
 Meeting Info Bi-monthly first Monday (March, May, July, September and November) at 1900 hours at the rear of St Stephen's Church.

73 Northern Wairoa Electronics Club

Branch Call-sign In Recess
 Contact Person(s) Peter Aikin ZL1TX

74 Wellington VHF Group (Inc)

Branch Call-sign ZL2WA
 Physical Address Tawa Community Centre, Cambridge Street, Tawa
 Postal Address PO Box 12 -259, Thorndon, Wellington 6144
 President Dick Greenbank ZL2TGQ
 Secretary Rob Wallace ZL2WAL
 Net Info 710 repeater on Wednesdays at 2000 hours
 Contact Person(s) Rob Wallace ZL2WAL
 Contact Ph No (04) 972-5571. E-mail: zl2wa@clear.net.nz
 Meeting Info Last Thursday each month (except December) at 1945 hours

75 Queenstown

Branch Call-sign In recess

76 Kaikoura

Branch Call-sign In Recess

77 Te Aroha and Districts Radio Club

Branch Call-sign In recess

78 Far North Districts Amateur Radio Club (Inc)

Branch Call-sign ZL1FND
 Physical Address Queen St, Awanui
 Postal Address PO Box 4, Awanui 0441
 President Bob Banks ZL1AUI
 Secretary Russell Shackleton ZL1BQK
 Net Info Far North 710 on Mondays at 1900 hours.
 Contact Person(s) Eric Manning ZL1GE.
 Contact Ph No (09) 406-7059
 E-mail rshack@xtra.co.nz
 Meeting Info Meetings held as required

79 Howick and Districts Radio Club

Branch Call-sign In recess

80 Hibiscus Coast Radio Society (Inc)

Branch Call-sign ZL1HCR & ZL1FU
 Physical Address 479/1 Whangaparaoa Road, Whangaparaoa 0932
 Postal Address 479/1 Whangaparaoa Road, Whangaparaoa 0932
 Secretary Geoff Hayes ZL1UKB, Telephone (09) 426 4285
 Treasurer Geof Hayes ZL1UKB
 Net Info 3810 kHz on Sundays at 0800 hours. 147.300 MHz repeater with Branch 71 Thursdays at 1930 hours
 Contact Person(s) Geoff Hayes ZL1UKB or Fred Kennedy ZL1BYP
 Contact Ph No (09) 424 2771
 E-mail radioclub80@kol.co.nz
 Meeting Info Third Wednesday even months at 1930, third Saturday odd months at 0930
 Committee Meeting Second Tuesday each month
 General Info AGM second Wednesday in December at 1930 hours

81 Waikato VHF Group (Inc)

Branch Call-sign ZL1IS
 Physical Address C/- 64 Sunnyhills Avenue, Glenview, Hamilton, 3206
 Postal Address PO Box 606, Waikato Mail Centre, Hamilton, 3240
 President Alan Wallace ZL1AMW
 Secretary Gavin Petrie ZL1GWP
 Net Info Waikato 695 on Sundays at 2045
 Contact Person(s) Gavin Petrie ZL1GWP
 Contact Ph No (07) 843-0326
 E-mail z1gwp@nzart.org.nz
 Meeting Info Last Sunday (February, May, August and November) at 1330 hours, listen to Sunday Net or visit website for details.

82 Southern Wairarapa Amateur Radio Club

Branch Call-sign ZL2SWR
 Physical Address St Johns Hall, Featherston
 Postal Address 38 Bell St, Featherston
 President Neil Rait ZL2BLM
 Secretary Peter Norden ZL2SJ
 Contact Person(s) Peter Norden ZL2SJ
 Contact Ph No (06) 308-6970
 E-mail z2sj@nzart.org.nz

83 Raglan Amateur Radio Club

Branch Call-sign ZL1CCT
 Physical Address 25 Bay View Road, Raglan
 Postal Address 25 Bay View Road, Raglan 2051
 Secretary Fred Gilbert ZL1FG
 Net Info Saturdays 3608 kHz at 0830 hours, 7088 if conditions dictate.
 Contact Person(s) Fred Gilbert
 Contact Ph No (07) 825-8018
 E-mail z1fg@ihug.co.nz

84 Bay of Islands Amateur Radio Club (Inc)

Branch Call-sign ZL1BOI
 Physical Address Rainbow Falls Road, RD2, Kerikeri
 Postal Address 63 Signals Road RD 1 Okaihau 0455
 President I. Wilson ZL1CBD
 Vice President D. Cottle ZL1HH
 Secretary N. Wallace ZL1IU
 Contact Person(s) D. Cottle ZL1HH or N. Wallace ZL1IU
 Contact Ph No Don Cottle (09) 407-9086, E-mail donc@xtra.co.nz or Nick Wallace (09) 401-9042, E-mail z1iu@xtra.co.nz
 Meeting Info Meetings are held as required

85 Mercury Bay

Branch Call-sign In Recess

86 Suburban Amateur Radio Club (Inc)

Branch Call-sign ZL1ZLD, ZL1ZLF
 Physical Address Musick Memorial Radio Station, 20 Musick Point Road, Bucklands Beach, Auckland
 Postal Address C/- PO Box 163060, Lynfield, Auckland 1443
 President Chairman Ian Walker ZL1BFB
 Secretary Ann Walker ZL1TRH
 Contact Person(s) Ian Walker ZL1BFB
 Contact Ph No (09) 626-7188 or Mobile 027 441-1820
 E-mail z1bfb@xtra.co.nz
 Meeting Info Second Sunday each month 1300 hours. Midweek group each Wednesday at 1000 to 1500 hours.

87 South Taranaki Amateur Radio Club (Inc)

Branch Call-sign ZL2QF
 Physical Address c/o Storage 411 Union St., Hawera
 Postal Address PO Box 156, Hawera 4640
 President Graeme Blyde ZL2UFN
 Secretary Alistair Tong ZL2ALT
 Treasurer Michael Mulholland ZL2WJM
 Net Info 705 repeater on Sundays 2000 hours
 Contact Person(s) Alistair Tong ZL2ALT
 Contact Ph No (06) 278 4652
 E-mail jandaton@inspire.net.nz
 Meeting Info 4th Monday of each month (except January) at 1930 hours at the Club rooms-Storage 411. Some meetings are held at alternative venues, check with secretary.
 Web <http://www.qsl.net/ZL2QF>

88 Tauranga Emergency Communications Group

Branch Call-sign ZL1TEC
 Physical Address Emergency Management Office, WBOPDC, Barks Corner, Tauranga 3112
 Postal Address 5 Graham Place, Bellevue, Tauranga 3110
 President Brian Heywood ZL1IE
 Vice President Don Spackman ZL1MK
 Secretary Gordon Cooper ZL1KL
 Treasurer Bill Richardson ZL1APD
 Net Info Tauranga 680 repeater, Wednesdays at 2030 hours (combined branches net)
 Contact Person(s) Brian Heywood ZL1IE
 Contact Ph No (07) 543-3677
 E-mail brian@eol.co.nz
 Meeting Info Third Thursday of each month, except December, 1930 hours at the clubrooms, EMO Office, Barks Corner.
 Committee Meeting Combined with Branch Meeting

(Affiliated) Canterbury Amateur Radio Development Society (Inc). (CARDS)

Branch Call-sign ZL3CAR
 Postal Address PO Box 21-188, Edgeware, Christchurch 8030
 President Mike Stubberfield ZL3MJS
 Vice President Mike Barnes ZL3TMB
 Secretary Lorna Allan ZL3AAZ
 Treasurer Mark Sullivan ZL3AB
 Contact Person(s) Lorna Allan ZL3AAZ
 Contact Ph No (03) 313-5352
 E-mail lorna.allan@getrheel.co.nz
 Meeting Info Third Wednesday of each month (except January) 1930 hours at the Branch 56 Clubrooms, Auburn Park, Christchurch

SUSTAINING THE AMATEUR SERVICE

A Responsibility for all Radio Amateurs!

The amateur radio qualification is an achievable challenge for most people and is useful to career seekers in our technological world. It shows aptitude, a sincere interest in communications, and identifies an achiever. Which can give a jump over others in this competitive world. The late 1940s was a time with a wave of new entrants into amateur radio. Let us all try to promote a return to that level of interest! The NZART Council encourages newcomers into Amateur Radio. This calls for the help of all radio amateurs. As a challenge to all of us, the NZART Council has adopted the expression, "The New Wave", to embrace initiatives and objectives which will encourage new entrants to the world of amateur radio.

The NZART Constitution in its object statement says: "The objects of the Association shall be the maintenance and expansion of the Amateur Service in New Zealand by:

- a) the encouragement of recruits into the Amateur Radio movement
- b) the provision of guidance and instruction in radio techniques and operating

c) the promotion organisation and conduct of activities on a national and local basis ...",

These objects are further reflected in wording in the NZART Strategic Plan, in particular Objective 2, which states:

- To promote knowledge of amateur radio and encourage newcomers.
- To assist Branches in local activities, especially in schools.
- To provide education and training aids.
- To award suitable prizes and other recognition."

And, in the plans of action:

"To publish information in Break-In, training materials and aids, educational and publicity material."

The NZART Strategic Plan Objective 3 states: "To provide guidance and instruction in radio techniques and operating, and encourage practical experimentation."

With your guidance and your help, others too can experience the thrills of Amateur Radio. Active encouragement and support are sought from all NZART members and Branches to recruit newcomers and to

run classes in preparation for the amateur radio examination. Branches are encouraged to actively promote Amateur Radio. Master copies of brochures, posters and other leaflets and publicity material are available to Branches free of charge, from NZART Headquarters.

A sticker is available to NZART members from NZART Headquarters for 50c each. This is for displaying in the rear window of vehicles to show your support in a national campaign to increase the awareness of Amateur Radio in the general population. Many computer users are unaware of amateur radio and what it has to offer. You are encouraged to widely advertise the NZART World Wide Web page, <<http://www.nzart.org.nz>>

Simple-to-construct equipment is a way to show youth groups and other interested persons the fun of Amateur Radio. Show how inexpensive home-construction brings delight and excitement from the achievement of communicating without wires over long distances using self-built gear. Articles from Break-In may be freely photocopied and distributed for this purpose. Do

you know anyone who has shown interest in Amateur Radio? A youth or grandchild perhaps? Spread the word by demonstration! After passing the amateur radio examination, a call-sign that is unique world-wide is issued by the Ministry of Economic Development. The challenge to attain such an identifying callsign brings its own rewarding fun. A local "group project", with the challenge to interest newcomers to develop their own local on-air amateur radio net, is worthy of consideration and encouragement. Construction of receivers, transmitters and other projects under the guidance of experienced constructors at "club workshop nights" is a worthy Branch activity. Each Branch should appoint an "NZART Agent" as one of their executive, the task being to gain increases in NZART members, both Transmitting and Non-Transmitting, in their local areas. A national and concerted effort by all New Zealand Radio Amateurs to promote Amateur Radio is necessary to ensure the continuation of a healthy and vigorous Amateur Service. Help bring the "The New Wave" of radio amateurs!

THE PROMOTION OF AMATEUR RADIO

Your work promoting AMATEUR RADIO is helped with this new STUDY GUIDE and sample TEST PAPERS

To help interested people become radio amateurs a **Study Guide** and sample **Test Papers** for the New Zealand Amateur Radio Examination are available:

1. The Study Guide and the TEST PAPERS are both available on one CD-ROM, packed in a gift folder, from NZART Headquarters. This is your chance to get computer-literate youngsters interested and involved in Amateur Radio! Send your name and Call-sign with \$10 to NZART

Headquarters with the name and the address of the person you wish to receive the Study Guide and Test Papers. A CD and gift folder will be posted—with your compliments. You will be named on the gift folder. (Installation instructions are in a .txt file on the CD and printed inside the gift-folder.)

2. The Guide and the Test Papers can also be viewed and used on-line – by anyone. Visit the NZART web page: <<http://www.nzart.org.nz/exam/>

[index.html](#)> and follow the links.

3. Both the Guide and the Test Papers can be downloaded in separate self-extracting files for installation on your own computer. Installation details are on the web page <<http://www.nzart.org.nz/exam/index.html>>. Downloading is recommended, so these documents can be used at any time.

Please Note:

1. These documents can be used as a source of hand-out notes for Instructors at Radio Classes. "Copy and paste" can be used to copy material into a word processor then photocopied for class use, or whole pages can be printed off.
2. The Guide is NOT a replacement for the NZART Basic Radio Training Manual. The two support and complement each other.

New Zealand Amateur Radio Stations Personal Call-signs as at 18 August 2010

The Ministry of Economic Development Radio Spectrum Management (RSM) have provided the following guide to entering your personal details:

There are discrepancies in the addresses recorded, as such some have part of their address not showing up.

When amateur radio operators have updated their record, addresses should be shown as follows:

| Address type | Address Residential/Physical | Address Billing/Postal |
|--------------|------------------------------|------------------------|
| Address 1: | Street address | PO Box |
| Address 2: | Town/ suburb | Suburb |
| Address 3: | City/Region | City/Region |
| Address 4: | City | City |
| Area Code: | Area Code | Area code |

Not all will complete all fields, but the most specific address should go to Address 1, while the least specific address should be entered into the highest address.

All should update their area code as NZ POST have recently updated this.

Details can be updated either online at:

<http://www.rsm.govt.nz/smart>
(you will need your log in details)

After logging on

>Select 'Logon Details'

>'Change your Client Details' menu. From here you can change basic information, including your email or by phoning RSM on 0508 776 463.

For Silent Keys, there is a form available at

<http://www.nzart.org.nz/policies/2006-call-sign-removal-form.html> and shown on the following page.

This can be filled in and posted to the NZART Business Manager at HQ (PO Box 40-525 Upper Hutt 5140) with relevant supporting documentation by a person authorised to do so.

It is recommended that the form be filled out and signed and left with the will, thus removing another job that the next of kin are required to do.

For further information, please see the help files at <http://www.nzart.org.nz/call-book/index.html>.

Please note that amateur radio operators are using a variety of ways of entering text, either all upper case, all lower case or first letter capitalised. It would be appreciated if text could be entered with the first letter capitalised. It makes the Call-Book Editor and typesetter's work much easier.

The names used in the following call-sign lists are those in the first name, last name fields which are not user editable and not the billing name field.

RSM and NZART have endeavoured to provide as accurate a call-sign list as possible given the difficulties with the removal of silent keys and most of the information being as provided by the user.

The New Zealand Association of Radio Transmitters Incorporated
PO Box 40-525 Upper Hutt

Application to remove a Client Record from the Radio Spectrum Management Register

The Radio Spectrum Management Database is a Government register established and maintained under the Radiocommunications Act 1989. A call-sign cannot be removed from the register, or given to a family member who is qualified to hold the call-sign, unless the ARX at NZART receives a direct instruction from a person with authority to make the request.

Please fill in as much of this form as is known and return to NZART at the above address.

I, the undersigned, instruct NZART to action the following call-sign(s) and information in the MED database:

Name: _____

Address: _____

City: _____

Date of Birth: _____

Call-sign(s): _____

Reason for Application: _____

Options: (Please cross out the option that does not apply)

1. I instruct NZART to remove the call-sign(s) _____ from the MED Register. I understand that the call-sign(s) will not be reallocated for a period of 12 months unless I make a direct request for the call-sign(s) to be reallocated to a specific person within this period.
2. I instruct NZART to remove the call-sign(s) _____ from the MED Register. I give my permission to allocate the following call-sign(s) to the following qualified person/people/organisation.

Call-sign Person/Organisation _____

NZART Membership: Please remove the above person from NZART Membership:

NZART Membership Number _____ (If Known)

1. Now: (Break-In delivery will cease ASAP)
 2. At the end paid subscription: (Break-In will continue until the subscription expires)
- (Please cross out option that does not apply.)

Name: _____ Signature: _____

Relationship to client: Next of Kin / Power of attorney / Executor in Estate / Solicitor acting for Executor

20091117

| | | | | | |
|-----------------|--------------------|--|---------------|--------------------|---|
| ZL18JOTA | Ms M Smolnicki | 19 Oakleigh St, Maungaraki, Lower Hutt 6009 | ZL1AEL | Mr J W Stanley | PO Box 525, Whangarei |
| ZL1AAA | Mr B D Gordon | 11 Siota Cres, Kohimarama, Auckland | ZL1AES | Mr A Skipper | 624 Whangaparaoa Rd, Stanmore Bay, Hibiscus Coast |
| ZL1AAB | Mr D J Cardy | 28 City View Tce, Birkenhead, Auckland 10 | ZL1AET | Mr A E Tse | Address Withheld |
| ZL1AAE | Mr J K Yearsley | Boat Harbour Rd, RD 1, Whitianga | ZL1AF | Mr I W Ogier | 32 Rangitane St, Palmerston North |
| ZL1AAF | Mr R L Walker | 128 Buffalo Beach Rd, Whitianga | ZL1AFB | Mr J L Offord | 43 Queens Rd, New Plymouth |
| ZL1AAH | Mr R B Backhouse | 17 Dale Rd, Kellys Bay, RD 1, Te Kopuru 0356 | ZL1AFE | Mr P De Renzy | Puketutu Rd, RD 2, Matamata |
| ZL1AAI | Mr J W De Jong | 28A Richmal St, Waihi 2981, Waikato | ZL1AFF | Mr J Fleming | 43 Burns St, Leamington |
| ZL1AAJ | Mr H J Williams | 30 Halberg St, Glenfield, Auckland 1310 | ZL1AFM | Mr P R Bellamy | 36 Eton Rd, Hillsborough |
| ZL1AAK | Mr C H L Stephens | 56 Karaka St, Takapuna | ZL1AFO | Mr G Rogers | PO Box 79, Kaitia |
| ZL1AAL | Mr A J Carruthers | 9A Cockle Bay Rd, Howick | ZL1AFN | Mr B E Cutfield | 28 Ocean Rd, Ohope 3121 |
| ZL1AAM | Mr P L Scott | 25 Chatsworth Cres, Pakuranga | ZL1AFQ | Mr D A R Rosan | PO Box 65-147, Mairangi Bay, Auckland 1330 |
| ZL1AAN | Mr H T Falkner | 8 Kapa St, Devonport | ZL1AFS | Mr T C M Cowley | 850 Beach Rd, Waiake, Auckland 10 |
| ZL1AAO | Mr L B Steel | 86 Bennett Rd, Te Mata, RD 5, Thames 3575 | ZL1AFT | Mr K Walker | 45 Apotu Rd, RD 1, Kamo, Whangarei |
| ZL1AAP | Mrs A A Pope | Address Withheld | ZL1AFU | Mr R J Murphy | 19 Litten Rd, Howick, Auckland 1704 |
| ZL1AAQ | Mr W J Palmer | 27 Thomas St, Tikipunga, Whangarei 0101 | ZL1AFV | Mr A R Boyce | 26 Shakespeare St, Cambridge |
| ZL1AAR | Mr R G Rowe | 32 Manawa Rd, Remuera | ZL1AFX | Mr M R Kilsby | PO Box 733, Kunuunurra, WA 6743, Australia |
| ZL1AAS | Mr A Scott | 25A Rodney St, Howick, Auckland | ZL1AFY | Mr P J Coleman | 2A Kohe St, Riverside, Whangarei |
| ZL1AAU | Mr C B Elley | Unit 11, Waihi Hosp Retirement Village, Village Way, Waihi | ZL1AFZ | Mr J P Mclean | Gorge Rd, RD 3, Pahiatua |
| ZL1ABC | Mr R R Biddle | Paerata, Pukekohe 1800 | ZL1AG | Mr A K Giles-Pain | Address Withheld |
| ZL1ABG | Mrs B Garlick | 14/1 Cambria St, Nelson | ZL1AGA | Mr J W Rasmussen | 65 Smith St, Matamata |
| ZL1ABI | Mr H Baer | 51/8 Fynn St, Birkdale, Auckland 0632 | ZL1AGC | Mr K M Passau | PO Box 444, Drury, Auckland |
| ZL1ABL | Mr A J Dale | 61 Rodney St, Wellsford, Auckland 0900 | ZL1AGG | Mr P E Bycroft | 253 Shirley Rd, Papatoetoe, Auckland |
| ZL1ABM | Mr M L G Humphrey | 1009 Tararu Rd, Thames | ZL1AGK | Mr B Clarke | 59 Blackwell Dr, Tryphena, Great Barrier Island, Auckland 0991 |
| ZL1ABN | Mr M J F Reay | 16 Priscilla Cres, Hamilton | ZL1AGL | Mrs Y H De Gruyter | 98 Maraetai Dr, Maraetai, Auckland |
| ZL1ABP | Mr K L Rutter | 55 Ellis Ave, Mt Roskill, Auckland 1004 | ZL1AGM | Mr A G Meharry | 21 Suzanne Grove, Kelvin Grove, Palmerston North 4414 |
| ZL1ABR | Mr B J Ward | 44 Cordylne Rd, RD 5 Tuakau, Port Waikato | ZL1AGN | Mr M H Campbell | Fencourt Rd, RD 1, Cambridge |
| ZL1ABS | Mr M J Sheffield | 176 Albany Highway, Albany, Auckland | ZL1AGP | Mrs H Horwood | 233 King St, Whakatane |
| ZL1ABX | Mr J R Dukes | 102 Awaruku Rd, Torbay | ZL1AGR | Mr J K Cotton | Villa 177 / Acacia Cove, 127 Wattle Farm Rd, Wattle Downs Auckland 1702 |
| ZL1ABZ | Mr I Johnson | 15 Muirend Ave, Tokoroa | ZL1AGS | Mr P E Collins | 185 Victoria St, Cambridge |
| ZL1ACD | Mr A H Coakley | 1 Clinton Ave, Te Atatu Peninsula, Auckland 1008 | ZL1AGT | Mr E R Taylor | 18 The Circle, Whangaparaoa, Auckland 1463 |
| ZL1ACE | Mr S P Winder | 138 Wellington St, Opatiki | ZL1AGV | Mr L N Dixon | 18 Koru St, Mangere Bridge |
| ZL1ACG | Mr E G Caldwell | 23 Clyma Pl, Massey, Auckland 1008 | ZL1AGW | Mr D F McDonald | Margaret Pl, RD 1, Whitianga |
| ZL1ACH | Mr R J M Ten Velde | 8 Matipo Pl, Tokoroa | ZL1AGY | Mr J A Easton | RD 9, Wheki Valley Hill, Whangarei |
| ZL1ACJ | Mr R H Turner | 7 Keiss St, Blenheim | ZL1AGZ | Mr J D Delaney | 41 Birdwood Rd, Swanson |
| ZL1ACK | Mr R F Marshall | PO Box 41172, St Lukes, Auckland | ZL1AH | Mr J D Wightman | 99C Eighth Ave, Tauranga |
| ZL1ACM | Mr C J McKenzie | 108 Prices Rd, Wiri, Manukau, Auckland 2025 | ZL1AHD | Mr M J Franklin | 138 Barrett Rd, RD3, Albany, Auckland |
| ZL1ACN | Mr D L Messent | 53 Russell Rd, Huntly | ZL1AHK | Mr W Tester | 48 Pulham Rd, Warkworth |
| ZL1ACT | Mr R N Miller | 72 Grattan Rd, Te Aroha | ZL1AHL | Mr G L Mclellan | 19 Kinder Pl, Ngongotaha, Rotorua |
| ZL1ACV | Mr D G L Twiss | Po Box 884, Taupo | ZL1AHM | Mr A D Bell | 182 Ocean Rd, Ohope |
| ZL1ACW | Mr A William | 304A Shoalhaven, 130 Anzac St, Takapuna, North Shore City 0620 | ZL1AHO | Mr R J Sykes | 263 Shirley Rd, Papatoetoe, Auckland 1701 |
| ZL1ACX | Mr B W Rous | 56 Tamahere Dr, Glenfield | ZL1AHP | Mr L S Greendale | PO Box 301, Pahia |
| ZL1ACY | Mr C J Billing | 16 Dobell Rd, Stanmore Bay, Whangaparaoa 1463 | ZL1AHT | Mr I D Buckland | 490 Coatesville Highway, RD 3, Albany 1331 |
| ZL1ACZ | Mr B C Williams | M3 66 Avonleigh Rd, Green Bay, Auckland | ZL1AHW | Mr R P Hoban | 462 Kaitemako Rd, Welcome Bay RD 5, Tauranga |
| ZL1AD | Mr D J Blackett | 56 Church St, Northcote, Auckland 9 | ZL1AHX | Mr A M King | Unit 2/106 Victoria St, Onewunga, Auckland 6 |
| ZL1ADA | Miss J R Wright | 28 Chorley Ave, Massey, Auckland 1008 | ZL1AHZ | Mr B F Kidd | 18 Addison Rd, Onerahi RD 1, Whangarei 0192 |
| ZL1ADB | Mr P G E Ataya | 4204 Great North Rd, Henderson | ZL1AI | Mr R G Badman | Villa 39, Lauriston Park, 91 Coleridge St, Cambridge |
| ZL1ADC | Mr R G Meharry | 111 Clarkin Rd, Fairfield, Hamilton | ZL1AIA | Mrs M B Baylis | 1 Munro St, Onerahi, Whangarei |
| ZL1ADE | Mr E J Duffy | 22 Duke St, Mt Roskill, Auckland | ZL1AIB | Mr N C Morris | PO Box 12357, Hamilton |
| ZL1ADG | Mr C W Hunt | 990/1 Bank St, Te Awamutu | ZL1AIF | Mr D M Reid | 2/97 King St, Whakatane 3120 |
| ZL1ADI | Mr C A Rademacher | 2247 South Head Rd, RD 1, Helensville | ZL1AIH | Mr RKF McCormack | 181 Ararimu Valley Rd, Waimauku, Auckland 0882 |
| ZL1ADL | Mr D N Wilkins | Edenvale Rest Home, 9 Edenvale Cres, Auckland 1024 | ZL1AII | Mr I R Mcfarlane | 20 Hakarimata Rd, Ngaruawahia |
| ZL1ADO | Mr J K Sullivan | 26 Karaka Park Pl, St Heliers, Auckland 1005 | ZL1AIJ | Mr C B Blake | 4 Blackwell Dr, RD 1 Tryphena, Great Barrier Island |
| ZL1ADP | Mr F J Medland | 11 The Lane, Medlands Bay, Great Barrier Island 1240 | ZL1AIK | Mr P J Lewis | 6 Tyburnia Ave, Mt Albert, Auckland |
| ZL1ADR | Mr C Robertson | 4 Dawn Pl, Te Atatu South, Waitakere City 0610 | ZL1AIM | Mr I M Morrison | 1520B State Highway 10, Kerikeri, RD3, Bay of Islands |
| ZL1ADS | Mr W J Tibbles | 19 Kotanui St, Army Bay, Whangaparaoa | ZL1AIP | Mr T H Parker | 11A Albert St, Paeroa |
| ZL1ADT | Dr K R Orr | Po Box 95-151, Auckland 1230 | ZL1AIR | Mr B E Armstrong | 24 Beach Rd, Mangonui 0557 |
| ZL1ADW | Mr B E Clark | 88 Lincoln Park Ave, Massey | ZL1AIS | Mr R J Dyer | 1712B State Highway 30, Rotorua |
| ZL1AE | Mr E Browne | 46 Holland Rd, Fairfield, Hamilton 3214 | ZL1AIX | Mr W J Robinson | Address Withheld |
| | | | ZL1AJ | Mr H F J Culloty | 316/1 Budden Rd, Pokuru RD 5, Te Awamutu |
| | | | ZL1AJD | Mr F J Krippner | Te Rore, RD 6, Te Awamutu |
| | | | ZL1AJH | Mr A J Hobbs | 97 Taupo Rd, Taumarunui 3920 |
| | | | ZL1AJI | Mr A W Jeffries | 70 Woodglen Rd, Glen Eden |
| | | | ZL1AJK | Mr W B Wood | 8 William Souter St, Takapuna |

As supplied by the Ministry of Economic Development Radio Spectrum Management on 18 August 2010. NOTE: NZART Councillors, Call-Book Editor, MED or any other person assisting with the production of this document cannot be held responsible for its accuracy. If there are address errors please contact RSM as described above.

| | | |
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| ZL1AKO | Mr R H Otto | Rangitane, RD 1, Kerikeri |
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| ZL1AKW | Mr D W J Horne | 3 Vine Ave, Tauranga |
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| ZL1AL | Mr T J Benton | C/- 5 Wilton St, Westown, New Plymouth |
| ZL1ALA | Mr J E Halden | 154 Opua Rd, RD 2, Ngatea |
| ZL1ALC | Mr A L Christensen | 116 Donald Rd, Kaitia |
| ZL1ALD | Mr D W Smith | 110 Douglas St, Whakatane |
| ZL1ALE | Mrs A B Johnston | 2/29 Manse Rd, Papakura, Auckland |
| ZL1ALG | Mr N Osborne | 15A Springfield Rd, Rotorua 3015 |
| ZL1ALH | Mr I G Lochmann | 19 Hillview St, Ngaruawahia |
| ZL1ALI | Ms A B Lee | P O Box 101 067, North Shore Mail Centre, Auckland 1330 |
| ZL1ALK | Mrs C M Reed | 510 Great South Rd, Papakura |
| ZL1ALN | Mr K G Duncan | 2 Marsh Ave, Milford |
| ZL1ALQ | Mr E I Deverick | PO Box 33-1306, Takapuna, Auckland |
| ZL1ALR | Mr S R Kay | PO Box 28-176, Auckland 1136 |
| ZL1ALS | Mr E L Salant | 28A Mc Arthur Ave, St Heliers, Auckland |
| ZL1ALT | Mr N J Adams | Matangi Rd, RD 4, Hamilton |
| ZL1ALV | Mr R R Ussher | 31A Deepcreek Rd, Browns Bay, Auckland 1310 |
| ZL1ALW | Mr J G Williamson | 70 Ngataranga Rd, Devonport, North Shore City 0624 |
| ZL1ALX | Mr G K Gubb | Unit 4/278 Shirley Rd, Papatoetoe, Auckland 1701 |
| ZL1ALY | Mr K Matthys | 120 Kent Terrace, Taradale, Napier |
| ZL1ALZ | Mr A J Balsillie | Avon Rd, RD 1, Pokeno |
| ZL1AMB | Miss A M Bain | RD 2, 58 George St, Pukekohe |
| ZL1AMC | Mr O H Zwies | 182 Stafford St, Hokitika 7810 |
| ZL1AMD | Dr A McDonald | 9 Tutaritai Rd, Hahei |
| ZL1AME | Mr F G Crook | 17 Hanlon Cres, Devonport, Auckland 1309 |
| ZL1AMF | Mr K F Gosling | 131 Onerahi Rd, Whangarei, Northland |
| ZL1AMG | Mrs A M McGee | 97A Balmain Rd, Birkenhead, Auckland 10 |
| ZL1AMH | Mr A Holroyd | 417A Kamo Rd, Kamo, Whangarei |
| ZL1AMI | Mr R A Jamieson | 11 Phillips Dr, Oropi Downs, RD 3, Tauranga |
| ZL1AMJ | Mr J R Saunders | 187 Gill St, New Plymouth |
| ZL1AMM | Mr R E Murphy | 14P Cradock St, Avondale, Auckland 1007 |
| ZL1AMN | Mr D A Johnston | 2/29 Manse Rd, Papakura, Auckland 1703 |
| ZL1AMO | Mr R W Wright | 28 Chorley Ave, Massey |
| ZL1AMP | Mr A Petricevich | 5 Seakens Way, Glen Eden, Waitakere City 0602 |
| ZL1AMQ | Mr F G Male | 67 Waipuna Rd, Mt Wellington |
| ZL1AMR | Mr I M Lindsay | 31 Cottesmore Pl, Huntington Park, East Tamaki, Auckland 2013 |
| ZL1AMT | Mr D A Moore | 2 Kanuka Way, Albany, Auckland 1311 |
| ZL1AMW | Mr A J Wallace | 14 Acacia Pl, Glenview, Hamilton |
| ZL1AMY | Mr I G Fletcher | 248 East Coast Rd, Takapuna |
| ZL1AMZ | Mr T Glendenning | 16 Meadow Dr, Whitianga 2856 |

| | | |
|----------------|--------------------|---|
| ZL1IAN | Dr G E J Bold | 15 Kauri Rd, Birkenhead, Auckland 1310 |
| ZL1IANA | Dr G T Bold | 14 Chelsea View Dr, Birkenhead, Auckland |
| ZL1IAND | Mr A B Turner | 7 Acmena Ln, Pakuranga |
| ZL1IANE | Mr J C Gingles | RD 3, Te Maika Rd, Whangarei |
| ZL1IANF | Mr W M Beale | 12 Emerson St, Te Aroha 3320 |
| ZL1IANH | Mr G K Hunt | 6 Newton Watts Dr, Kerikeri 0294 |
| ZL1IANI | Mr K A Bell | 62B Eden Tce, Kamo |
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 R W Sebire, 32 Neri Crescent, Rotorua 3201
 L F Simmonds, 3 Jervois Street, Kawerau 3127
 R D Smith, 90 Anzac Road, Morningside, Whangarei 110
 J W Strachan, 47 Morgans Road, Glenwood, Timaru 7910
 W R C Webb, 13 Rembrandt Avenue, Tawa, Wellington 5028
 F G Wiggins ZL1306, P O Box 522, Tokoroa 2392

As supplied by the Ministry of Economic Development Radio Spectrum Management on 18 August 2010. NOTE: NZART Councillors, Call-Book Editor, MED or any other person assisting with the production of this document cannot be held responsible for its accuracy. If there are address errors please contact RSM as described above.

BRANCH & ORGANISATION CALL-SIGNS

| Call-sign | Branch | Title | Trustee | Address |
|----------------|--------|---|------------------------|--|
| ZL1S | 81 | Waikato VHF Group (Inc) | Refer Branch Directory | |
| ZL1B | 53 | NZART Te Puke Branch Inc | Refer Branch Directory | |
| ZL1AA | 2 | NZART Auckland Branch Inc | Refer Branch Directory | |
| ZL1AB | 29 | North Shore Amateur Radio Club (Inc) | Refer Branch Directory | |
| ZL1ABCD | | Auckland Contest Club (Acc) | Mr J Calvo | C/- Jacques Calvo, 31 Raurenga Ave, Epsom, Auckland |
| ZL1AC | 3 | Western Suburbs Radio Club Inc | Refer Branch Directory | |
| ZL1ACS | | Ken Clarke Radio Club | Mr P Granger | 585 Bedford Road North, RD8, Inglewood 4388 |
| ZL1AM | 28 | Whangarei Amateur Radio Club | Refer Branch Directory | |
| ZL1BCO | 60 | NZART Taupo Branch | Refer Branch Directory | |
| ZL1BL | 17 | Huntly Branch 17 Amateur Radio Club | Refer Branch Directory | |
| ZL1BN | | Northern DX Association | Mr M K Woodfield | 182 Ingleton Road, RD 2, Wellsford |
| ZL1BOI | 84 | Bay Of Islands Amateur Radio Club (Inc) | Refer Branch Directory | |
| ZL1BQ | 66 | Auckland VHF Group (Inc.) | Refer Branch Directory | |
| ZL1BY | 72 | Opotiki Amateur Radio Club | Refer Branch Directory | |
| ZL1CB | 40 | NZART Te Auamutu Branch 40 | Refer Branch Directory | |
| ZL1CCT | 83 | NZART Raglan Branch 83 Inc | Refer Branch Directory | |
| ZL1DF | 41 | Thames Branch NZART Inc | Refer Branch Directory | |
| ZL1FND | 78 | Far North District Amateur Radio Club | Refer Branch Directory | |
| ZL1FU | 80 | Hibiscus Coast Amateur Radio Club Inc | Refer Branch Directory | |
| ZL1HF | 44 | Matamata Amateur Radio Club | Refer Branch Directory | |
| ZL1HK | | South Auckland Repeater Group | | C/- A V Walker, 51 Caronia Cres, Mt Roskill, Auckland |
| ZL1HP | 4 | Cambridge Amateur Radio Club | Refer Branch Directory | |
| ZL1IZ | 55 | Waitomo Branch 55 NZART (Inc) | Refer Branch Directory | |
| ZL1KDX | | Amateur Radio Field Station Group | | 225 Bridgman Road, Te Awamutu, |
| ZL1KW | 67 | NZART Kawerau Branch | Refer Branch Directory | |
| ZL1MCC | | Manukau City Council (Amateur Radio) | Mr M R Lowry | 31 To 33 Wiri Station Road, Manukau, Auckland |
| ZL1MUA | | Massey University LEO Satellite Ground Station | | Massey University Institute Of Information And Mathematical Sciences, Private Bag 102904 Nsmc Auckland 1330, |
| ZL1QB | 21 | Manukau Radio Club | Refer Branch Directory | |
| ZL1QW | 43 | Waihi & District Branch NZART Inc | Refer Branch Directory | |
| ZL1REG | | Radio Electronics Group | Mr J T Lisignoli | The Secretrary, No. 14 Northmeadow Drive, Rototuna |
| ZL1RMC | | Rosmini College Parent Teachers Friends Association (Inc) | | 36 Dominion Street, Takapuna, Auckland |
| ZL1ROD | 71 | Rodney Amateur Radio Club Inc | Refer Branch Directory | |
| ZL1ROT | 33 | Rotorua Branch 33 (NZART) Inc | Refer Branch Directory | |
| ZL1SA | 10 | Franklin Amateur Radio Club Inc | Refer Branch Directory | |
| ZL1SKC | | Saint Kentigern College | Mr K D Ferguson | PO Box 51-060, Pakuranga, |
| ZL1TEC | 88 | Tauranga Emergency Communications Group | Refer Branch Directory | |
| ZL1TP | 39 | Tauranga Amateur Radio Club Inc | Refer Branch Directory | |
| ZL1UX | 12 | Hamilton Amateur Radio Club (Inc) | Refer Branch Directory | |
| ZL1VK | 65 | Papakura Radio Club Inc | Refer Branch Directory | |
| ZL1WCD | | Waitakere Civil Defence Radio Club | | 7 Elcoat Avenue, Henderson, Auckland |
| ZL1WK | 51 | NZART Eastern BOP Branch | Refer Branch Directory | |
| ZL1ZLD | 86 | Suburban Amateur Radio Club Inc | Refer Branch Directory | |
| ZL1ZLF | | Musick Memorial Radio Station Museum | Mr I D Walker | C/- Suburban Amateur Radio Club Inc, PO Box 163060, Lynfield, Auckland 1008 |
| ZL2AA | 11 | Gisborne Amateur Radio Club Inc | Refer Branch Directory | |
| ZL2AA | 46 | NZART Wairarara | Refer Branch Directory | |
| ZL2AB | 27 | New Plymouth Amateur Radio Club | Refer Branch Directory | |
| ZL2AJZ | | Massey University (Electronics) Amateur Radio Club | Mr A G Kennedy ZL1BYP | Private Box 756, Wellington |
| ZL2AMR | 70 | Feilding & Districts Radio Club | Refer Branch Directory | |
| ZL2AMS | 23 | Marton Branch NZART | Refer Branch Directory | |
| ZL2ANN | 32 | Opunake Radio Club, Inc Rahotu Br. NZART | Refer Branch Directory | |
| ZL2ARG | 26 | NZART Nelson Branch Inc | Refer Branch Directory | |
| ZL2AS | 13 | Hastings Branch NZART (Inc) | Refer Branch Directory | |
| ZL2AW | 42 | Titahi Bay Amateur Radio Club Inc | Refer Branch Directory | |
| ZL2DS | 16 | Horowhenua Branch 16 NZART | Refer Branch Directory | |
| ZL2GK | 24 | Motueka Branch NZART | Refer Branch Directory | |
| ZL2GT | 25 | Napier Amateur Radio Club Inc | Refer Branch Directory | |
| ZL2HV | 18 | NZART Huit Valley Branch Inc | Refer Branch Directory | |
| ZL2IB | 6 | Tararua District Radio Club | Refer Branch Directory | |
| ZL2JA | 48 | Wanganui Branch NZART | Refer Branch Directory | |
| ZL2KB | 69 | NZART Kapiti Branch Inc | Refer Branch Directory | |
| ZL2KO | 20 | NZART Manawatu Branch Inc | Refer Branch Directory | |
| ZL2KS | 22 | NZART Marlborough Branch 22 Inc | Refer Branch Directory | |
| ZL2LHW | 63 | Upper Hutt Branch NZART Inc | Refer Branch Directory | |

**BRANCH
CALL-SIGNS**

CALL-SIGNS

| Call-sign | Branch | Title | Trustee | Address |
|------------------|--------|---|------------------------|--|
| ZL2M | | East Coast Contesters | Mr L F Jennings | 87 Auckland Rd, Greenmeadows, Napier |
| ZL2MG | 45 | Waimarino Branch NZART | Refer Branch Directory | |
| ZL2NX | | Kiwi Contest Group | | C/O Mr TJ Hogan, PO Box 39-166, Wellington Mail Centre, Wellington |
| ZL2PT | 19 | Inglewood Branch 19 NZART | Refer Branch Directory | |
| ZL2QF | 87 | South Taranaki (Inc.) | Refer Branch Directory | |
| ZL2QH | | Wellington Amateur Radio Club Inc (Quartz Hill) | | PO Box 6464, Marion Square |
| ZL2RN | | Royal Naval Amateur Radio Society NZ Branch | | 34 Bell Street, Otaki, |
| ZL2RS | | Royal Signals Amateur Radio Society | Mr C M Kempson | C/- C M Kempson, 399B Te Moana Road, Waikanae |
| ZL2SWR | 82 | Southern Wairarapa Branch NZART | Refer Branch Directory | |
| ZL2TO | 47 | NZART Waitara Branch Inc | Refer Branch Directory | |
| ZL2VH | 63 | Upper Hutt Branch NZART Inc | Refer Branch Directory | |
| ZL2WA | 74 | Wellington VHF Group Inc | Refer Branch Directory | |
| ZL2WB | 50 | Wellington Amateur Radio Club (Inc.) | Refer Branch Directory | |
| ZL2WRC | | Wairarapa College Radio Club | | PO Box 463, Masterton, |
| ZL3AC | 5 | NZART Christchurch Branch 05 Inc | Refer Branch Directory | |
| ZL3ADG | | Burnside High School Radio Club | | Greens Rd, Christchurch, |
| ZL3AF | 1 | Ashburton Branch NZART | Refer Branch Directory | |
| ZL3BRC | 62 | Reefton-Buller Branch NZART | Refer Branch Directory | |
| ZL3CAR | | Canterbury Amateur Radio Development Society Incorporated | Mr M S Barnes | |
| ZL3GY | 49 | Westland Branch NZART | Refer Branch Directory | |
| ZL3RNL | | Rangiora New Life School Amateur Radio Club | Mr J M Berends | Denchs Rd, Southbrook, Rangiora |
| ZL3RPS | | Radio Preservation Society Of NZ (Ferryroad) Inc | | 269 Bridle Path Rd, Christchurch, |
| ZL3RR | 68 | North Canterbury Amateur Radio Club | Refer Branch Directory | |
| ZL3UR | 34 | South Canterbury Branch Inc | Refer Branch Directory | |
| ZL3VV | 56 | Christchurch West Amateur Radio Club | Refer Branch Directory | |
| ZL3WP | | Buller High School Radio Club | | 35 Derby St, Westport, |
| ZL4AA | 30 | NZART Otago Branch Inc | Refer Branch Directory | |
| ZL4AL | 8 | Eastern Southland Branch NZART Inc | Refer Branch Directory | |
| ZL4FUN | | NZART HQ | Mrs D Morgan | C/- NZART, PO Box 40-525, Upper Hutt |
| ZL4GQ | 37 | NZART Southland Branch Inc | Refer Branch Directory | |
| ZL4JF | 35 | NZART South Otago Branch 35 | Refer Branch Directory | |
| ZL4KHS | | Kings High School Radio Club | Mr K A Hand | 270 Bayview Rd, South Dunedin, Dunedin 9012 |
| ZL4NQ | 75 | NZART Queenstown Branch 75 Inc | Refer Branch Directory | |
| ZL4OO | 61 | NZART Central Otago Branch Inc | Refer Branch Directory | |
| ZL4OU | 64 | NZART North Otago Branch 64 | Refer Branch Directory | |
| ZL50JA | | Wanganui Branch NZART | | |
| ZL6A | | New Zealand Association Of Radio Transmitters Inc | Mr J A Meachen ZL2BHF | PO Box 40-525, Upper Hutt |
| ZL6B | | New Zealand Association Of Radio Transmitters Inc | | |
| ZL6CC | | NZART Marlborough Branch 22 Inc | | |
| ZL6FF | | FISTS Club - NZ Chapter | Mr R Sutton | 12C Herbert Gardens, 186 The Terrace, Wellington |
| ZL6IW | | New Zealand Association Of Radio Transmitters Inc | | |
| ZL6JAM | | NZART Christchurch Branch 05 Inc | | |
| ZL6KCM | | Kapiti Coast Museum Waikanae Inc | Mr G A Anderson ZL2JG | 9 Elizabeth Street, Waikanae 6010, |
| ZL6LHW | | Upper Hutt Branch NZART Inc | | |
| ZL6LIT | 12 | Hamilton Amateur Radio Club (Inc) | Refer Branch Directory | |
| ZL6NS | | Wellington VHF Group Inc | | |
| ZL6OTC | | New Zealand Old Timers Club (ZL) | | 25 Annandale Street, New Plymouth |
| ZL6QH | 50 | Wellington Radio Amateur Club (Inc) | ZL2AOH | Refer Branch Directory |
| ZL6R | | New Zealand Association Of Radio Transmitters Inc | | |
| ZL6RFA | 27 | New Plymouth Amateur Radio Club | Refer Branch Directory | |
| ZL6RR | | North Canterbury Amateur Radio Club | | Refer Branch Directory |
| ZL6SAT | | Amsat-ZL | Mr T D Carrell | C/- NZART, PO Box 40-525, Upper Hutt |
| ZL6TOC | | Gisborne Amateur Radio Club | | Refer Branch Directory |
| ZL6YL | | NZ Women Amateur Radio Operators | | C/O Mrs Jn O'Donnell, 39 Lismore St, New Plymouth |
| ZL6ZA | | NZART Manawatu Branch Inc | | Refer Branch Directory |
| ZL80WB | | Wellington Amateur Radio Club (Inc.) | | PO Box 6464, Marion Square, Wellington |
| ZL8R | | Microlite Penguins Dxpediton Team | Mr C C Hannagan | C/- Chris Hannagan, 173 Southdown Rd, RD 1 |
| ZL94ANZAC | 74 | Wellington VHF Group Inc | Refer Branch Directory | |
| ZM2E | 50 | Wellington Amateur Radio Club (Inc) | ZL2AOH | Refer Branch Directory |
| ZM2JOTA | 74 | Wellington VHF Group (Inc) | | Refer Branch Directory |
| ZM18JOTA | 18 | NZART Hutt Valley Branch (Inc) | | Refer Branch Directory |

AREC OFFICERS 2010/2011

| <i>E.Call</i> | | | <i>Call</i> | <i>Home</i> | <i>Work/Mobile</i> | <i>Deputy</i> | <i>Call</i> | <i>Home</i> | <i>Work/Mobile</i> |
|---------------|----------------------|-----------------|-------------|---------------|--------------------|---------------|-------------|---------------|--------------------|
| ZK6EX | National Director | Jeff Sayer | ZL4JS | (06) 370-1245 | (027) 450-8022 | Geoff Chapman | ZL3PX | (03) 942-8180 | |
| ZK6EXS | National Secretary | Doug Cooke | ZL1TTE | (09) 846-6075 | (027) 497-8121 | | | | |
| ZK1EX | Area ManagerZL1 | Richard Gamble | ZL1BNQ | (09) 537-1238 | (021) 729-270 | Jim Rowe | ZL1AVR | (07) 868-9193 | (027) 235-7266 |
| ZK8EX | Area ManagerZL2 | John Yaldwyn | ZL4JY | (04) 478-3222 | (04) 499-6000 | Terry Waghorn | ZL2AYY | (06) 306-8926 | (027) 488-7271 |
| ZK9EX | Area ManagerZL3 | Gareth Bradshaw | ZL3VP | (03) 332-2406 | (027) 432-4738 | Paul Rennie | ZL2RE | (03) 578-5311 | (027) 458-9740 |
| ZK4EX | Area ManagerZL4 | Bill Olsen | ZL4AE | (03) 455-7884 | (027) 436-9107 | Martin Balch | ZL4JH | (03) 454-3262 | (027) 437-5242 |
| ZK6EX | Land SAR Liasion | Jeff Sayer | ZL4JS | (06) 370-1245 | (027) 450-8022 | | | | |
| ZK6EXT | Nat.Training Officer | TBA | | | | | | | |

AREC SECTION LEADERS & DEPUTIES

| <i>E.Call</i> | <i>Section</i> | <i>Section Leader</i> | <i>Call</i> | <i>Home</i> | <i>Work/Mobile</i> | <i>Deputy Leader</i> | <i>Call</i> | <i>Home</i> | <i>Work/Mobile</i> |
|---------------|--------------------|-----------------------|-------------|----------------|--------------------|----------------------|-------------|---------------|--------------------|
| ZK1EA | Auckland | Japie Nel | ZL1JUN | (09) 537-3852 | (021) 217-8601 | Steve Miller | ZL1FS | (09) 528-5756 | (021) 022-6498 |
| ZK1EB | North Shore | Marcel Montile | ZL1ME | (09) 443-1011 | (021) 210-5984 | Graham Barton | ZL1GMB | (09) 446-0089 | |
| ZK1EC | Hamilton | David Nation | ZL1TCE | (07) 843-0108 | (027) 474-3292 | Paul Jonassen | ZL1UPJ | (07) 847-9719 | (021) 298-7780 |
| ZK1ED | Te Awamutu | Brian Farrell | ZL1HN | (07) 843-4847 | (021) 203-4193 | Mervyn Owen | ZL2AVY | (07) 871-9992 | |
| ZK1EG | Northland | Brian Winger | ZL1BSW | (09) 438-3862 | (027) 491-3888 | Don Ewen | ZL1DTE | (09) 432-0185 | (027) 451-9940 |
| ZK1EI | Thames | Jim Rowe | ZL1AVR | (07) 868-9193 | (027) 235-7266 | Mary Sutton | ZL1UHZ | (07) 868-7290 | (021) 185-7250 |
| ZK1EJ | Tauranga ECG | Don Spackman | ZL1MK | (07) 543-2730 | (021) 066-3380 | Alison Eade | ZL1PD | (07) 579-9739 | (027) 451-9693 |
| ZK1EK | Western Suburbs | Ross Reddell | ZL1VRR | (09) 629-0504 | (027) 622-1055 | Merv Thomas | ZL1SK | (09) 828-7174 | (027) 499-0262 |
| ZK1EM | Eastern B.O.P. | Alan McDonald | ZL1PI | (07) 308-7740 | (027) 604-8844 | Don Croll | ZL1TBP | (07) 308-7699 | |
| ZK1EN | Franklin | Colin Shuker | ZL3CJS | (09) 239-2635 | (027) 493-1025 | Bob Holt | ZL1BBZ | (09) 235-9549 | (027) 200-0331 |
| ZK1EO | Kawerau | Barry Liddle | ZL1CAY | (07) 323-8970 | (021) 223-2901 | Bob Krause | ZL1TMK | (07) 323-8560 | |
| ZK1EQ | Rotorua | Peter Dare | ZL1PJ | (07) 345-6469 | (07) 343-5883 | Murray Thompson | ZL1SY | (07) 348-9741 | |
| ZK1ES | Papakura | Richard Gamble | ZL1BNQ | (09) 537-1238 | (021) 729-270 | David Karrasch | ZL1DK | (09) 298-5271 | (021) 560-180 |
| ZK1EU | Manukau | Granville Emmett | ZL1BYD | (09) 273-2673 | (027) 471-1731 | Ivan Lindsay | ZL1AMR | (09) 272-8295 | |
| ZK4EA | Otago | Lindsey Ross | ZL4KS | (03) 487-8946 | (021) 116-1686 | David Stevenson | ZL4SB | (03) 454-2527 | (027) 435-7307 |
| ZK4EB | E. Southland | Lindsay Eunson | ZL4LC | (03) 206-4587 | (027) 432-5136 | Murray Giles | ZL4MG | (03) 208-6803 | (021) 169-5647 |
| ZK4ED | Balclutha | John Blair | ZL4AM | (03) 415-7849 | (027) 284-4283 | Russell Bennett | ZL3GM | (03) 417-7411 | |
| ZK4EE | Centr.Otago | J. Lochhead | ZL4QS | (03) 448-8552 | (027) 273-5785 | TBA | | | |
| ZK4EF | North Otago | Neil McLeod | ZL4SN | (03) 434-7253 | (027) 334-7759 | Gary Millar | ZL4TA | (03) 434-5993 | (03) 434-5029 |
| ZK6EE | Auckland VHF Grp. | Laurie Mathews | ZL1ICU | (09) 634-5130 | (027) 481-7463 | Franc Dunhton | ZL1SLO | (09) 829-2003 | (021) 396-381 |
| ZK8EA | Gisborne | Alan Mackintosh | ZL2AOP | (06) 868-6267 | | Roly Haisman | ZL2APH | (06) 868-6422 | |
| ZK8EB | New Plymouth | Jill O'Donnell | ZL2DBO | (06) 758-1429 | | Wayne Gaudin | ZL2VN | (06) 753-5800 | (06) 753-6139 |
| ZK8EC | Motueka | Robin Reeve | ZL2FZ | (03) 528-6868 | (021) 634-993 | Jim Jackson | ZL2BCG | (03) 528-8357 | |
| ZK8EE | Hastings | Robert Wallace | ZL2SG | (06) 878-4993 | (027) 434-4027 | Warren Harris | ZL2AJ | 0800-219284 | (021) 649-284 |
| ZK8EF | Kapiti | Len Blackley | ZL2GO | (04) 904-7048 | (021) 071-7114 | David Chapman | ZL2DWC | (04) 298-7252 | |
| ZK8EG | Wellington VHF Grp | John Yaldwyn | ZL4JY | (04) 478-3222 | (04) 499-6000 | Jeff Sayer | ZL4JS | (06) 370-1245 | (027) 450-8022 |
| ZK8EH | Tararua District | Stephen Cooper | ZL2WAU | (06) 374-8288 | (021) 548-288 | Jim Edwards | ZL1UBE | (06) 374-7261 | (021) 156-2524 |
| ZK8EI | Manawatu | Len Inkpen | ZL2LI | (06) 357-1493 | (027) 447-4034 | Cherly Weatley | ZL2VCC | (06) 326-8551 | (027) 223-3677 |
| ZK8EJ | Wairarapa | David Bray | ZL2BA | (06) 378-8288 | (027) 449-5146 | Gavin McAnulty | ZL2VGB | (06) 377-3978 | (027) 429-16105 |
| ZK8EL | Upper Hutt | Maurice Vile | ZL2ADP | (04) 976-9022 | | Gavin Smith | ZL2ACT | (04) 970-8533 | (027) 226-5719 |
| ZK8EN | Nelson | Dave Scott | ZL2BCA | (03) 545-0237 | (027) 446-4714 | Brian Hawken | ZL2BJ | (03) 547-0382 | (021) 230-9592 |
| ZK8EO | Marlborough | Paul Rennie | ZL2RE | (03) 578-5311 | (027) 458-9740 | Ron Harris | ZL2BDD | (03) 575-7181 | (021) 103-5143 |
| ZK8ES | Horowhenua | Kenneth Ireland | ZL2KI | (027) 444-9449 | (027) 444-9449 | James Jones | ZL2USA | (06) 368-1122 | (021) 763-939 |
| ZK8EW | Marton | Brian Purdie | ZL2ADL | (06) 329-3606 | (027) 321-4470 | Jim Vernon | ZL2BHX | (06) 388-1855 | (027) 446-2628 |
| ZK8EY | Hutt Valley | Phill Lewton | ZL2HF | (04) 567-9354 | | Bob Sewell | ZL2ASO | (04) 564-6929 | |
| ZK8 ?? | South Taranaki | Michael Mulholland | ZL2WJM | (06) 278-6155 | (027) 326-0864 | Gary Legge | ZL2GLM | (06) 278-6586 | |
| ZK9EA | Christchurch | Dudley Berry | ZL3GG | (03) 389-4718 | (027) 436-4405 | Steve Davis | ZL2UCX | (03) 348-0360 | (027) 436-1796 |
| ZK9EB | Westland | Graham Hay | ZL3WMM | (03) 768-9499 | (021) 114-6840 | Kevin O'Sullivan | ZL3ABY | (03) 768-7598 | (027) 498-6435 |
| ZK9EC | Sth.Canterbury | Glenn May | ZL3GL | (03) 686-0306 | (027) 433-5022 | David Hetherington | ZL3UDH | (03) 688-3619 | (027) 687-6787 |
| ZK9ED | Ashburton | Jim Nelson | ZL3ND | (03) 318-5827 | (027) 289-3833 | Steve Graham | ZL2BBK | (021) 745-051 | |
| ZK9EG | Nth.Canterbury | Geoff Gillman | ZL3QR | (03) 313-7137 | (027) 647-5490 | Don MacDonald | ZL3DMC | (03) 327-7415 | (027) 551-6683 |

AREC records have been updated from the National Database. Any additions or omissions to AREC Secretary, P.O. Box 44-132, Pt Chevalier, Auckland

This is a list of active AREC sections based on 'Activity Reports' received by the AREC Secretary over a 18 month period. Correct as at July 2010

The IARU Monitoring Service (MS), a global organisation, was formed in Geneva in 1985. It comprises three regional MS, with New Zealand being in region 3. In turn the regional MS are made up from the national societies' MS, such as the NZART MS, with national co-ordinators and other volunteers who assist in reporting, identifying and dealing with non-amateur interference on the amateur bands. This structure provides a mechanism through which ordinary radio amateurs in any country can identify and report harmful interference on the amateur bands and, where necessary, escalate things to the regional or international bodies and various regulatory authorities for concerted action.

The radio frequency spectrum is a limited, shared resource that is constantly under pressure from multiple users, not all of whom respect the rights of radio amateurs. It is clearly in our interests to protect the amateur frequencies allocated for our use. With the increasing demands for spectrum space and the tendency of some administrations to ignore their responsibilities under the ITU convention, the amateur service must maintain a strong and effective MS if it is to retain its frequency allocations. It is vital that we continue to present factual, authoritative information about intruders to the authorities, and proactively defend our rights. The cooperative, global nature of the IARU MS provides us with a more powerful voice.

Intruders

An intruder is any non-amateur radio transmission in the



Courtesy of BBC Monitoring "A History of Caversham Park."

exclusive amateur bands. Note that not all amateur bands are exclusively allocated to us: we have access to some on a primary or secondary basis alongside other users with mutual non-interference obligations, and the allocations vary globally. Some intruders are unlicensed pirates. Some administrations claim the right to use any frequency they like including the amateur bands – some (such as North Korea) are not members of the ITU, while a few casually ignore certain ITU regulations at their convenience. Some do not even appreciate that they are causing harmful interference by spurious or harmonic radiation, and that is where the MS can help by bringing the problem to their notice.

Radio was a more elusive medium to track and be sure what was being said and in what tone.

Harmful interference

Harmful interference is that which seriously degrades obstructs or repeatedly interrupts a radiocommunication service, such as the Amateur Service, operating in accordance with the ITU Radio Regulations. Harmful interference is classed as either out-of-band or spurious emissions:

- **Out-of-band emissions** are emissions on a frequency or frequencies which are outside the necessary bandwidth, which result from the modulation process. Their choice of frequency is normally deliberate and intentional;
- **Spurious emissions** are emissions outside the necessary bandwidth, the level of which may be reduced without affecting the corresponding transmission of information. Spurious emissions include harmonics, parasitics, intermodulation products ("intermod") and frequency conversion products. These are normally accidental or unintentional transmissions. Whether or not they fall within permitted technical limits (e.g. harmonics so many decibels down from the fundamental), they may still interfere with amateur transmissions.

The growth of digital computing, networking and telecommunications equipment is causing severe interference problems for many radio amateurs. Some of the worst offenders are PCs, plasma screens, WiFi routers

and switch mode power supplies (not least those in many amateur households!) which tend to cause relatively localised problems that can sometimes be reduced using suitable ferrite cores, by increasing the distance between antennas and nearby buildings, or by replacing offending items with quieter/better screened equipment. Experimental technologies such as "Broadband over Power Lines" (BPL) have the potential to wipe out entire HF bands over wider areas, while collectively such wideband interference sources are raising the noise floor for us all. This insidious threat is of great concern to NZART MS and our colleagues abroad, especially since many amateurs rely on relatively low power transmissions and hence weak signals over difficult paths that seldom concern other radiocommunication services.

Reporting

The most direct way for ZL amateurs and SWLs to report amateur band intruders is by email (our contact details are given below). When reporting, please provide as much information as possible to help us characterise the intruder, namely:

- The **spot frequency or frequency range** over which interference was caused, as accurately as you can;
- The **date and time or time period** in which it occurred, in UTC please;
- The nature of the interfering signal, ideally stating the **mode or type of emission** using the official designations but if not some indication such as Over The Horizon Radar (OTHR), Coastal Ocean Dynamics Applications Radar (CODAR), USB/LSB, AM, FM or digital modes (note: to help you identify obscure signals, there are several audio samples on the NZART MS Web page at <http://www.nzart.org.nz/ms> plus links to additional helpful Web resources elsewhere).
- Any **station call-sign or identification** transmitted by the intruder (hint: listen out for jingles and station IDs transmitted at the top of the hour by most commercial broadcasters);
- **Other helpful remarks** such as any traffic or text transmitted, the length of transmissions or how often the transmissions have been heard,

type of music or background noises, languages spoken, peak direction (azimuth) from your Maidenhead locator or town, approximate signal strength etc.;

- If you have the opportunity, please also attach an **audio sample** as an MP3 or WAV file, and/or an audio spectrum "waterfall" image: these provide invaluable supporting evidence.

On receipt of an intruder report, the NZART MS voluntary observers, in conjunction with our colleagues in ZL, VK, IARU Region 3 and sometimes further afield, will further analyse the information, for example to determine the specific type/mode of transmission or language used. If reports are received promptly, we usually check to find out whether we can also hear the same intrusion (indicating a widespread problem) or not (possibly a localised or short term interference source). Collating and comparing intruder reports from many reports increases the probability of being able to identify the sources. Using direction finding techniques, for example, we may be able to tell the approximate or actual source locations (more below). We always try to provide feedback to reporters, for instance confirming whether this is a known intruder that we are already dealing with, or a newcomer that needs further work. Intruder reports from ZL feed our regular consolidated reporting to IARU Region 3 MS and are disseminated in turn to the other two regions.

Direction Finding

Direction finding involves identifying the locations from which signals are transmitted. At least two contemporaneous reports on the same signal are normally required to triangulate signals on the HF bands: one may be your own station while others may belong to other MS volunteers or even Web-accessible Software Defined Radios (SDRs) such as <http://websdr.ewi.utwente.nl:8901/> or <http://www.websdr.org/>. You may be able to help us without even owning a receiver or antenna, for example finding out whether there is propagation to our part of the globe at that time from the area where we suspect an intruder might be located. If you have some sort of rotatable beam antenna, the intruder



*Broadcast reception in the Listening Room
"History of Caversham Park."*

normally lies somewhere along the great circle direction that gives the maximum signal strength. If you have a rotatable dipole, nulls off both ends of the dipole can be used to indicate two approximate directions by turning the antenna until the signal dips out. Under certain circumstances, intruders may even be located by accurately timing pulses received simultaneously over both short and long paths (this is where audio recordings of repetitive pulse radar systems can prove useful). As a last resort, simply reporting what other parts of the world you could hear at that time, or the language used, gives a very rough indication of the possible location of an intruder. You never know, someone else may be able to corroborate your report and so fill-in the missing information.

Reporting Local Intruders to the Radio Spectrum Management

Any one can report an intruder, suspected pirate or interference

to the Radio Spectrum Manager group via the procedure outlined in http://www.rsm.govt.nz/cms/consumers/copy_of_reception-problems/how-can-i-register-an-interference-complaint. However, in the majority of cases, direct liaison with the miscreant normally solves the issue with assistance from the NZART officers or club members. However, in order to save the RSM group a great deal of time and effort in terms of conducting an investigation, the NZART MS Co-ordinators collate the required information and verify its authenticity before submitting it. We are then prepared to answer any questions the RSM Inspector or Manager may ask with respect to our submission. This approach has worked very successfully within New Zealand.

Reporting International Intruders to the IARUMS Region 3 Co-ordinator

The MS Co-ordinators collate the

required information and verify its authenticity before submission an intruder report to the IARUM MS Co-ordinator for Region 3 (Peter – VK3MV). He then collates the information and verifies the information received from other Region 3 reports before making a formal submission to the responsible Telecommunication Authority (TA) as a formal complaint. The procedure used by the Wireless Institute of Australia is: <http://www.wia.org.au/members/intruder/about/> Details on how to contact the IARUMS R3 Regional MS Coordinator are available via the NZART Monitoring Service web links: <http://http://www.nzart.org.nz/ms/index.html>

How to contact us

NZART Monitoring Service relies heavily on your reports. We do not handle complaints by amateurs against other amateurs, which are for the National Society or the NZ radio authorities to deal with. However, we do deal with pirates, commercial broadcasters and other non amateur intruders who, for whatever reason, cause interference on the exclusive amateur bands. A vast amount of work by many dedicated individuals and groups over many decades has gone into making the amateur service what it is today. We, the present generation of radio amateurs, have a responsibility to help keep it that way for ourselves and future generations. One of the most important ways we can do this is to report intruders into our exclusive bands. The longer we ignore them, the harder

it will be to remove them. Do nothing and we may gradually lose the right, not just the ability, to use the amateur bands due to intrusions.

Please report intruders as soon as possible after you log them, using email if possible as that allows us to act quickly. You can email the NZART MS co-ordinator or deputy directly, or send a message to one of the general ZL amateur email reflectors (such as KiwiDX or ZLhams) but it is better to submit reports to the email reflector set up for this specific purpose, namely IntruderWatch@GoogleGroups.com. You are very welcome to join the Intruder Watch group – visit <http://groups.google.com/group/IntruderWatch> to apply—and help us by reporting and/or characterising intruders.

If you don't have access to email, please submit your reports to either of us by telephone or even by post:

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ITU CLASSES OF EMISSION CODE

The basic characteristics of radio emissions are usually given in a three symbol group, such as A1A for Morse code.

These symbols are arrived at as follows:

First symbol—type of modulation of the main carrier.

Second symbol—nature of signal(s) modulating the main carrier.

Third symbol—type of information to be transmitted.

Modulation used only for short periods and incidental purposes, such as identification, may be ignored.

1. First symbol—type of modulation of main carrier

- | | | |
|-------|--|---|
| 1.1 | Emission of an unmodulated carrier | N |
| 1.2 | Emission in which the main carrier is amplitude modulated, including angle-modulated sub-carriers— | |
| 1.2.1 | Double-sideband | A |
| 1.2.2 | Single-sideband, full carrier | H |
| 1.2.3 | Single-sideband, reduced or variable carrier | R |
| 1.2.4 | Single-sideband, suppressed carrier | J |
| 1.2.5 | Independent sidebands | B |
| 1.2.6 | Vestigial sideband | C |
| 1.3 | Emission in which the main carrier is angle-modulated— | |

- | | | |
|---------|--|---|
| 1.3.1 | Frequency modulation | F |
| 1.3.2 | Phase modulation | G |
| 1.4 | Emission in which the main carrier is amplitude and angle-modulated either simultaneously or in a pre-established sequence | D |
| 1.5 | Emission of pulses— | |
| 1.5.1 | Sequence of unmodulated pulses | P |
| 1.5.2 | A sequence of pulses— | |
| 1.5.2.1 | Modulated in amplitude | K |
| 1.5.2.2 | Modulated in width/duration | L |
| 1.5.2.3 | Modulated in position/phase | M |
| 1.5.2.4 | In which the carrier is angle-modulated during the period of the pulse | Q |
| 1.5.2.5 | Combination of the above | V |
| 1.6 | Cases not covered above in which an emission consists of the main carrier modulated in a combination of angle, amplitude, or pulse | W |
| 1.7 | Cases not otherwise covered | X |

2. Second symbol: nature of signals modulating the main carrier—

- | | | |
|-----|--|---|
| 2.1 | No modulating signal | 0 |
| 2.2 | A single channel containing quantized or digital information, without the use of modulating sub-carrier* | 1 |
| 2.3 | A single channel containing quantized or digital information, with the use of a modulating sub-carrier*2 | 2 |
| 2.4 | Single channel containing analogue information | 3 |
| 2.5 | Two or more channels containing quantized or digital information | 7 |
| 2.6 | Two or more channels containing analogue info | 8 |
| 2.7 | Composite system with quantized or digital information together with analogue information | 9 |
| 2.8 | Cases not otherwise covered | X |

*This excludes time-division multiplex.

3. Third symbol—type of information to be transmitted

- | | | |
|-----|---|---|
| 3.1 | No information transmitted | N |
| 3.2 | Telegraphy—for aural reception | A |
| 3.3 | Telegraphy—for automatic reception | B |
| 3.4 | Facsimile | C |
| 3.5 | Data transmission, telemetry, telecommand | D |
| 3.6 | Telephony—including sound broadcasting | E |
| 3.7 | Television (video) | F |
| 3.8 | Combination of above | W |
| 3.9 | Cases not otherwise covered | X |

For a more complete description, the three symbol group may be preceded by a four symbol group representing the necessary bandwidth. This group must comprise three numerals and one letter, which must be H, K, M, or G. The letter is placed at the position of the decimal point in the number denoting the bandwidth in hertz, kilohertz, megahertz or gigahertz respectively.

The calculation of necessary bandwidths is complicated and only a few examples can be covered here. For CW Morse, the baud rate is 0.8 times the words per minute. The bandwidth is three or five times the baud rate, depending on the absence or presence of QSB. SSB Phone is just the highest modulating frequency. Double it for AM. FSK, RTTY (any code) is the baud rate plus 1.2 times the frequency shift.

Optionally, two more symbols may be added to the basic characteristics of emissions.

The optional additional characteristics are:

Fourth symbol—details of signal(s).

Fifth symbol—nature of multiplexing.

1. Fourth symbol — details of signal(s)

- | | | |
|------|--|---|
| 1.1 | Two-condition code with elements of differing numbers and/or durations | A |
| 1.2 | Two-condition code with elements of the same number and duration without error-correction | B |
| 1.3 | Two-condition code with elements of the same number and duration with error-correction | C |
| 1.4 | Four-condition code in which each condition represents a signal element (of one or more bits) | D |
| 1.5 | Multi-condition code in which each condition represents a signal element (of one or more bits) | E |
| 1.6 | Multi-condition code in which each condition or combination of conditions represents a character | F |
| 1.7 | Sound of broadcasting quality (mono) | G |
| 1.8 | Sound of broadcasting quality (stereo) | H |
| 1.9 | Sound of commercial quality (excluding categories K and L) | J |
| 1.10 | Sound of commercial quality with the use of frequency inversion or band-splitting | K |
| 1.11 | Sound of commercial quality with separate FM signals for level control | L |
| 1.12 | Monochrome television or facsimile | M |
| 1.13 | Colour television or facsimile | N |
| 1.14 | Combination of the above | W |
| 1.15 | Cases not otherwise covered | X |

2. Fifth symbol—nature of multiplexing

- | | | |
|-----|--|---|
| 2.1 | None | N |
| 2.2 | Code-division multiplex (including bandwidth expansion techniques) | C |
| 2.3 | Frequency-division multiplex | F |
| 2.4 | Time-division multiplex | T |
| 2.5 | Combination of F and T | W |
| 2.6 | Other types of multiplexing | X |

Examples

| | |
|-------------------------------|-----------|
| 25 wpm Morse on a local net: | 060HA1AAN |
| 25 wpm Morse on a DXpedition: | 100HA1AAN |
| Classic HF Baudot RTTY: | 1K07F1BBN |
| SSB Phone: | 2K85J3EJN |
| AM Phone: | 5K70A3EJN |
| So-called FM Phone on VHF: | 16K0G3EJN |
| 1200 baud Packet on VHF: | 16K0G2DCN |
| 9600 baud Packet on VHF: | 13K2F1DCN |
| GPS satellite navigation: | 100KG7DCC |
| On/off keyed Hellschreiber: | 050HV1CAN |



ITU EMISSION EXAMPLES

First example: Continuous wave telegraphy, Morse code, CW

Where Bn = Necessary bandwidth in hertz

Where bandwidth formulae is: Bn = BK or (B times K)

B = Modulation rate in bauds

K = an overall numerical factor which varies according to the emission and which depends upon the allowable signal distortion (K= 5 for fading circuits and K = 3 for nonfading circuits)

How do you convert 25 Words per Minute (WPM) into bauds?

Officially the speed in bauds is the reciprocal of the duration of the shortest or smallest telegraph element, when timed in seconds.

The standard way to do this is to send an agreed standard word consisting of five characters, which happens to be "PARIS" for timing purposes. Which if you count it out is equal to 49 timing units, based on the fact that a dit is the shortest unit. The length of a dah is 3 units; the space between dits and dahs is 1 unit. The space between characters is 3 units and the space at the end of the word is 6 units. As a result, if WPM is equal to 49W symbols per minute. So 49W/60 equals 0.81666 W symbols per second. Therefore 25 WPM x 0.81666 equals 20 Bauds. 25 WPM: B = 20, K = 5, Bandwidth: 100Hz

So the designation of emission becomes: **100HA1AAN** or simplified to **A1A**

Note: the fourth symbol is a two condition code with elements of differing numbers and/or durations

The fifth symbol is None.

Second example: Telephony, double-sideband (single channel) – broadcast station

Where M = Maximum modulation frequency in hertz

Where the Bandwidth formulae is: Bn = 2M or (2 times M)

If M = 3000, the resultant bandwidth 6000 Hz = 6 kHz

So the designation of emission

becomes: **6K00A3EJN** or simplified to **A3E**

What happens in the case of a Single Sideband transmission with a suppressed carrier (single carrier)? See third example below.

Third example:

In this case Bandwidth Bn = M (Modulation) minus the lowest modulation frequency

So if M = 3000. The lowest modulation frequency is 300 Hz. The resultant bandwidth 2700 Hz = 2.7 kHz

So the designation of emission becomes: **2K70J3EJN** or simplified to **J3E**

Note: the fourth symbol is: J – Sound of commercial quality (excluding categories given in sub-paragraphs 1.10 and 1.11)
Fifth symbol is: None

Note: Although J3E is Single Sideband it is really is useful to distinguish between Lower Sideband and Upper Sideband i.e. J3E/L or J3E/U as the frequency offset will be different in each case.

Fourth example: Commercial telephony using Frequency Modulation

Where Bandwidth formulae is: $B_n = 2M + 2DK$

D = Peak deviation i.e. half the difference between the maximum and minimum values of the instantaneous frequency. The instantaneous frequency in hertz is the time rate of change in phase in radians divided by 2π (where π equals 3.14159)

$K = 1$

If D = 5000 Hz, M = 3000. The resultant bandwidth 16000 Hz = 16 kHz

So the designation of emission becomes: **16K0F3EJN** or simplified to **F3E**

Note: the fourth and fifth symbols are the same as above

Fifth Example: PSK31 or BPSK31

The necessary bandwidth is 60Hz

or 60 Hz. The originator of PSK31 refers to a bit rate of 31.25 bauds or a bit rate of 31.25 per second, this equates to approximately 35 Word Per Minute in terms of speed. The necessary bandwidth required equates to 2BK. Where B relates to bit rate per second or Modulation rate in baud and K is a factor of 1. Therefore the necessary bandwidth required is 62.50 Hz or 62H5 – however most papers refer to the necessary bandwidth as 60H0.

The correct mode is G1B. There are two modes with PSK31 either Binary Phase Shift Keying (BPSK) or Quadrature PSK. I noticed that the ARRL show the designator of emission as J2B (BPSK) or J2D (QPSK), based on the normal method used on the air i.e. SSB or LSB.

The ITU designation of emission for BPSK31 is 60H0G1B— and 60H0G1D— for QPSK31. However the complete designation of emission for BPSK31 is:

60H0G1BBN. QPSK31 is 60H0G1DCN, which uses error correction.

MFSK16

In the case of MFSK16, the emission designator, the ITU calculations are as follows:

$BW = B + M.S.K$ (where B equals baud rate, M is the number of tones, and S is the tone spacing,

K is factor related to keying technique (K equals 1.2 for coherent phase keying or hard keyed FSK)). Using the following example: taken from ZL1BPU:

Symbol Rate = 15.625 baud

Channel Data Rate = $15.625 \times \log_2 16 = 15.625 \times 4 = 62.5$ BPS

User Data Rate = $62.5 \times 1/2$ (Forward Error Rate or FEC Rate) = 31.25 BPS

Text Throughput (CPS) = 31.25 / 10 CPS = 3.125 CPS

Text Throughput (WPM) = $31.25 \times 60 / (10 \times 6) = 31.25$ WPM

Tone spacing is 15.625 Hz

So $BW = 15.625 + 16 \times 15.625 \times 1.2 = 315.625$ Hz

Where CPS is Characters Per Second, WPM is Words Per Minute and BPS is Bits Per Second. So the necessary bandwidth becomes 316H. The designation of emission becomes 316HF1B— using the appropriate tables. The designation of emission becomes 316HF1BCN (error correction included).

Appendix – Frequency measurement

<http://en.wikipedia.org/wiki/Frequency>

A1E- Centre frequency of emission

A3E – Broadcast Stations – Centre frequency of emission and bandwidth taken

Emission Measure frequency

at F1B/RTTY Centre frequency or halfway between the two carriers

F3E/FM Resolution frequency of the modulation

F3C Centre frequency of emission

F7B Centre frequency of the four carriers

FXX Centre frequency of emission

G7D Beginning, Centre frequency of emission and End often heard on 30 Metre band

M7D Beginning, Centre frequency of emission and End – note Pulse Repetition Frequency (PRF)

<http://en.wikipedia.org/wiki/Radar>

JAM Centre frequency of emissions

QXX Beginning, Centre frequency of emission and End

J3E Upper or Lower Resolution frequency of the sideband i.e. J3E/L or J3E/U

J8E Resolution frequency of the two sidebands

N0N Zero beat of carrier

P0N or PXX – Beginning, Centre frequency of emission and End – often used by Over The Horizon Radar

VXX – Beginning, Centre frequency of emission and End – often used by Coastal Ocean Dynamics Applications Radar (CODAR)

IARU INTERNATIONAL AMATEUR RADIO UNION

NZART IARU LIAISON OFFICER:
IARU REGION 3 LIAISON DIRECTOR:
COMMITTEE: NZART PRESIDENT:

FMTAG CHAIRMAN:
NZART ALO:

JOHN LOCHHEAD ZL4QS
PETER LAKE ZL2AZ
ROY SYMON ZL2KH
TERRY CARRELL ZL3QL
DAVID ANDREWS ZL2SX
DON WALLACE ZL2TLL
FRED JOHNSON ZL2AMJ

Where do I fit in?

As a radio amateur, your NZART Membership is vital to all of us. Amateur Radio is an activity requiring international coordination in radio frequency spectrum matters. This is achieved through several international organizations and your support is needed.

Membership of NZART acknowledges importance for the continuance of amateur radio in New Zealand, of representation by radio amateurs to government and liaison between NZART and overseas amateur radio societies.

ITU — the International Telecommunication Union

The ITU is a United Nations

Agency and can be viewed as an assembly of government representatives. See the ITU web page at <www.itu.int>. New Zealand is a Member and the New Zealand Administration is the Ministry of Economic Development. The MED spectrum management web page is at <www.rsm.govt.nz/csm>.

Through its International Radio Regulations, the ITU allocates radio services to specific frequency bands. Member states are required to recognize these treaty provisions when licensing services to operate on specific frequencies within their own regulations and national boundaries. The ITU Radio Regulations also define the Amateur Service and the Amateur

Satellite Service and set down other operating requirements.

Frequency band allocations and the International Radio Regulations themselves are reviewed at ITU World Radiocommunication Conferences (WRC).

The New Zealand Radio Regulations reflect the International Radio Regulations.

The International Amateur Radio Union (IARU)

The IARU is a Sector Member of the ITU where it represents the Amateur Services. It is recognized by administrations as the appropriate body to make recommendations on amateur radio issues. The IARU is permitted to present papers for the information of ITU conferences.

The IARU is a worldwide voluntary federation of more than 150 amateur radio societies, founded in 1925. New Zealand joined in 1929. The prime purpose

of the IARU is the protection of the Amateur and Amateur Satellite Services. The IARU Constitution is at the IARU web page: <www.iaru.org>.

The IARU is co-ordinated by an Administrative Council (AC) comprising a President, Vice-President, and two representatives from each of the three Regions: Region 1 covers Europe, Russia and Africa, Region 2 the Americas, and Region 3 the remainder including New Zealand and Asia Pacific area.

One society provides the IARU Secretary and the IARU International Secretariat (IS) administrative services. Currently this is the American Radio Relay League (ARRL).

The business of IARU is transacted at triennial regional conferences arranged in sequence so that one is held each year. The IARU member-societies of the Region meet at these regional conferences to discuss common problems, to find solutions, to

determine policy, and promote international amateur radio. Each Region has its own IARU regional organization. NZART is a founder and active member of IARU Region 3. Founded in 1968, the IARU Region 3 Secretariat is in Tokyo. The affairs of the Region are attended to between conferences by Directors who are elected at the triennial conference.

NZART

Founded in 1926, NZART is the New Zealand society. The IARU Constitution recognizes only one member-society in each country. NZART is duty-bound to represent the interests of the Amateur and Amateur Satellite Services. NZART is recognised by and makes representations to the New Zealand Administration, the Ministry of Economic Development, on behalf of itself and the IARU.

NZART also makes presentations to IARU Regional Conferences and can influence IARU policies.

IARU representatives at ITU conferences

The IARU is represented at ITU conferences by a selected team of specialists in amateur radio affairs drawn from IARU societies worldwide.

For some important ITU conferences, a representative of the Amateur Service is included in national delegations from Member countries. Where appropriate, NZART finances an Amateur Service representative in New Zealand's delegation. There was an NZART representative on the New Zealand Delegations to ITU conferences in 1979, 1982, 1997, 2003 and 2006.

The International Amateur Radio Union (IARU) Region 3, 14th Triennial Conference was held on 12-16 October, 2009 hosted by the NZART in Christchurch, New Zealand.

Delegates from 10 member societies (ARRL, ARSI, CRSA, HARTS, JARL, KARL, NZART, ORARI, SARTS and WIA) attended, with RAST, RSGB and VARC being represented by proxy. Also attending was the IARU President Tim Ellam VE6SH and Vice President Ole Garpestad LA2RR, from Region 1 President Hans Timmerman PB2T and Secretary Dennis Green ZS4BS and Region 2 Secretary Ramon Santoyo XE1KK.

The IARU R3 Directors had identified two topics, the IARU Monitoring System, and emergency

communications, as being highly important, and major decisions were made on both of them.

The International Radio Regulations

A copy of the text of the regulations pertaining to Amateur Radio can be obtained on request from NZART Headquarters or from the "Study Guide" found at the NZART web page. A full copy of the Radio Regulations is available from the ITU Geneva but occupies several volumes. It is also available on CD-ROM, and is expensive. The International Radio Regulations do not of themselves regulate radio amateurs. With the status of an international treaty, they set out what administrations are expected to impose by their own national regulations.

International challenges for amateur radio

All classes of radio service compete for their share of the radio frequency spectrum. Most services wield strong influence at ITU conferences. Decisions made there are affected by many factors, political, economic and social. At times the conference atmosphere is hostile to amateur radio.

Some decisions take many years to implement. The patient pursuit of long-term policies is needed to ensure the future welfare of the Amateur and Amateur Satellite Services.

The cost of this continuing vigilance is high. It comes from the radio amateurs in national societies and from the devoted voluntary efforts by many amateur radio specialists. A part of your NZART subscription is remitted to IARU Region 3 each year to help fund international activities.

Remember, there is no actual security for the Amateur or Amateur Satellite Service. Constant vigilance, with time and money to protect our regulatory provisions are needed.

Further information

Enquiries on international radio matters are welcome at NZART Headquarters.

See the IARU web site at <www.iaru.org> and the Region 3 web site at <www.iaru-r3.org>. Both can be accessed via <www.nzart.org.nz>.

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AMATEUR RADIO EXAMINATIONS

by
DEBBY MORGAN ZL2TDM
NZART Examination Co-ordinator

General

The amateur Service is defined in the Radio Regulations as: a radio-communication service for the purpose of self training, inter communication and technical investigations carried out by amateurs, that is by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.

In accordance with Article 25.6 of the International Telecommunications Union Radio Regulations regarding technical and operational qualifications of amateur stations, a person operating an amateur station (whether the licensee or other person authorised by the licensee) must be the holder of a General Amateur Operator's Certificate granted in accordance with the Radiocommunications Regulations 2001.

There is now only one New Zealand amateur radio licence: General Amateur Radio Operator Licence.

Examination structure

There is only one Amateur Radio Examination. It is a sixty-question multiple-choice written examination in: radio regulations, the principles of electricity, radiotelegraphy, and radiotelephony; operating procedures, service codes and abbreviations as are applicable to the amateur service; and in the adjustment and operation of radio apparatus used in a typical amateur radio station. The sixty

questions are randomly-selected by computer from a 600-question public-domain question-bank to form an examination paper. Every exam paper is different. Study Courses Training materials and a book showing all the 600-questions are available from NZART at the address given below. See the NZART web page: <www.nzart.org.nz>.

Requirements for certificates

Forty correct answers are required for a pass.

Taking the examination

The Examination Division of NZART conducts examinations on behalf of the Ministry of Economic Development Radio Spectrum Management group (MED RSM).

The date, time and place for the examination are by mutual arrangement between the supervisors and the candidates. The allowed time for the examination is two hours, with an extra reading time of ten minutes.

Applications for examinations

Applications for all examinations should be made to your local examination supervisor. A list of supervisors can be found on the NZART web page or from NZART Headquarters. The supervisors expect you to contact them.

Examination fees

A fee of \$5 is required to accompany the examination

application. Should you fail the first time and wish to re-sit, there is no further fee.

Examination result notification

If you are successful you will receive an Examination Result Notification (ERN) form direct from the examiners. On completion of a Radio 4A Application Form, please forward the ERN and the application form to NZART on the address listed on the form together with \$95 which includes a one year membership to NZART.

Examination recounts

Applications for recounts of the marks awarded must be made to the NZART Examination Division no later than one month after the examination in respect of which mark in question was awarded.

Call-signs

Your licence gives your call-sign. Application may also be made for a specific radio call-sign, if not already allocated.

Further enquiries

Please direct any enquiries about the Amateur Radio Examination to: NZART Examination Division, PO Box 40-525, Upper Hutt 6415.

Telephone (+64 4) 939-2189, Fax (+64 4) 939-2190. E-mail <exam@nzart.org.nz>.

Morse code

Competency in the Morse code is not needed for a licence. NZART

provides a Morse test for travellers to countries requiring evidence of Morse competency for reciprocal licensing. Tests are also available by mutual arrangement for individual challenge purposes.

A certificate of achievement is available from Morse testing supervisors on attaining a speed of five words per minute or higher, sending and receiving. The test details are available on application.

Note to branches

The NZART Morse Testing Service is managed by the Examination Co-ordinator, an officer of the Association. The Morse tests are administered by participating NZART Branches. Branches are responsible for choosing a Morse Tester and a Scrutiniser from the members of their Branch. These persons should be members of NZART. NZART requires the names, call signs and contact details of the persons the Branch nominates to these roles, with this information annually updated. The Examination Co-ordinator will appoint the Morse Examiners. Each is given registration number.

A candidate is to contact a local Morse Tester. The Tester will arrange a date for the test. The test text pieces will be computer-generated in Farnsworth format. Each Branch is responsible for providing the necessary hardware, computer, oscillator, key and earphones as required. There is no fee for a Morse test.

Radiocommunications Regulations (General User Radio Licence for Amateur Radio Operators) Notice 2010

Pursuant to section 111 of the Radiocommunications Act 1989 and Regulation 9 of the Radiocommunications Regulations 2001, and acting under delegated authority from the chief executive, I give the following notice.

Notice

1. Short title and commencement — (1) This notice is the Radiocommunications Regulations (General User Radio Licence for Amateur Radio Operators) Notice 2010.

(2) This notice comes into force on 12 August 2010.

2. General user radio licence — A general user radio licence

is granted for the transmission of radio waves by amateur radio operators in New Zealand, for the purpose of communications in the amateur radio service in accordance with the terms, conditions and restrictions of this notice.

3. Terms, conditions and restrictions applying to New Zealand amateur operators

(1) Persons who hold a General Amateur Operator's Certificate of Competency and a call-sign issued pursuant to the Regulations may operate an amateur radio station in New Zealand.

(2) The call-sign prefix of "ZL" may be substituted with the prefix "ZM" by the call-sign holder for

the period of, and participation in, a recognised contest, or as the control station for special event communications.

(3) Operation on amateur bands between 5 MHz and 25 MHz is not permitted unless a person has held a General Amateur Operators Certificate of Competency for three months and logged 50 contacts during this period. The person must keep the logbook record for at least one year and, during this period, produce it at the request of the chief executive.

4. Terms, conditions and restrictions applying to visiting amateur operators

(1) Persons visiting New Zealand

who hold a current amateur certificate of competency, authorisation or licence issued by another administration, may operate an amateur station in New Zealand for a period not exceeding 90 days, provided the certificate, authorisation or licence meets the requirements of Recommendation ITU-R M.1544 or CEPT T/R 61-01 or CEPT T/R 61-02 and is produced at the request of the chief executive.

(2) The visiting overseas operator must use the national call-sign allocated by the other administration to the operator, in conjunction with the prefix or suffix "ZL" which is to be separated from the national

call-sign by the character “/” (telegraphy), or the word “stroke” (telephony).

5. Terms, conditions and restrictions applying to all amateur operators—

(1) The use of call-signs, including temporary and club call-signs, must be in accordance with publication PIB 46 “Radio Operator Certificate and Call-sign Rules” published at www.rsm.govt.nz.

(2) Call-signs must be transmitted at least once every 15 minutes during communications.

(3) National and international communication is permitted only between amateur stations, and is limited to matters of a personal nature, or for the purpose of self-training, intercommunication and radio technology investigation, solely with a personal aim and without pecuniary interest. The passing of brief messages of a personal nature on behalf of other persons is also permitted, provided no fees or other consideration is requested or accepted.

(4) Communications must not be encoded for the purpose of obscuring their meaning, except for control signals by the operators of remotely controlled amateur stations.

(5) Except as provided to the contrary in this notice, transmitter power output must not exceed 500 watts peak envelope power (pX), as defined in ITU Radio Regulation 1.157.

(6) Amateur stations must, as far as is compatible with practical considerations, comply with the latest ITU-R recommendations to the extent applicable to the amateur service.

(7) In accordance with Article 25 of the International Radio Regulations, amateur operators are encouraged to prepare for, and meet, communication needs in support of disaster relief.

(8) Amateur beacons, repeaters

and fixed links may not be established pursuant to this licence.

(9) Unwanted emissions outside the frequency bands specified in this schedule must comply with the requirements of technical standard ETSI ETS 300 684 published by the European Telecommunications Standards Institute (ETSI).

(10) This general user radio licence applies only to transmissions within the frequency ranges set out in the Schedule to this licence. All such transmissions must be made in accordance with the notes for the frequency range in which that transmission take place and in accordance with the other conditions set out in this licence.

6. Consequential revocation of licences — The Radiocommunications Regulations (General User Radio Licence for Amateur Radio Operators) Notice 2010 dated the 9th day of February 2010 and published in the New Zealand Gazette, 18 February 2010, No. 18, page 430, is revoked.

Schedule

| Frequency Range | Notes |
|----------------------|------------|
| 130 to 190 kHz | 2, 4, 6 |
| 505 to 515 kHz | 2, 4, 7, 8 |
| 1.80 to 1.95 MHz | 2 |
| 3.50 to 3.90 MHz | 2 |
| 7.00 to 7.10 MHz | 1 |
| 7.10 to 7.20 MHz | |
| 7.20 to 7.30 MHz | 2 |
| 10.10 to 10.15 MHz | 2 |
| 14.00 to 14.35 MHz | 1 |
| 18.068 to 18.168 MHz | 1 |
| 21.00 to 21.45 MHz | 1 |
| 24.89 to 24.99 MHz | 1 |
| 26.95 to 27.30 MHz | 2, 3, 5, 6 |
| 28.00 to 29.70 MHz | 1 |
| 51.00 to 53.00 MHz | 2 |
| 144.00 to 146.00 MHz | 1 |

| Frequency Range | Notes |
|----------------------|---------|
| 146.00 to 148.00 MHz | 2 |
| 430.00 to 440.00 MHz | 1, 2, 3 |
| 921.00 to 928.00 MHz | 3, 7 |
| 1.24 to 1.30 GHz | 1, 2 |
| 2.396 to 2.45 GHz | 1, 3 |
| 3.30 to 3.41 GHz | 1, 2 |
| 5.65 to 5.85 GHz | 1, 3 |
| 10.00 to 10.50 GHz | 1, 2 |
| 24.00 to 24.05 GHz | 1, 3 |
| 24.05 to 24.25 GHz | 3 |
| 47.00 to 47.20 GHz | 1 |
| 75.50 to 76.00 GHz | 1, 2 |
| 76.00 to 81.00 GHz | 1, 2 |
| 122.25 to 123.00 GHz | 2, 3 |
| 134.00 to 136.00 GHz | 1 |
| 136.00 to 141.00 GHz | 1, 2 |
| 241.00 to 248.00 GHz | 1, 2, 3 |
| 248.00 to 250.00 GHz | 1 |
| 275.00 to 1000 GHz | 2, 4 |

Notes to Schedule

1. The following ranges of frequencies may also be used for amateur satellite communications:

| | |
|----------------------|----------------------|
| 7.00 to 7.10 MHz | 3.40 to 3.41 GHz |
| 14.00 to 14.25 MHz | 5.65 to 5.67 GHz (a) |
| 18.068 to 18.168 MHz | 5.83 to 5.85 GHz (b) |
| 21.00 to 21.45 MHz | 10.45 to 10.50 GHz |
| 24.89 to 24.99 MHz | 24.00 to 24.05 GHz |
| 28.00 to 29.70 MHz | 47.00 to 47.20 GHz |
| 144.00 to 146.00 MHz | 75.50 to 81.00 GHz |
| 435.00 to 438.00 MHz | 134.00 to 141.00 GHz |
| 1.26 to 1.27 GHz (a) | 241.00 to 250.00 GHz |
| 2.40 to 2.45 GHz | |

(a) Limited to the earth-to-space direction.

(b) Limited to the space-to-earth direction.

2. These frequencies are, or may be, allocated for use by other services. Amateur operators must accept interference from, and must not cause interference to, such other services.

3. The frequencies:

27.12 MHz (26.957 – 27.283 MHz),
433.92 MHz (433.05 – 434.79 MHz),
921.5 MHz (915 – 928 MHz),
2.45 GHz (2.4 – 2.5 GHz),
5.8 GHz (5.725 – 5.875 GHz),

24.125 GHz (24.00 – 24.25 GHz),
122.5 GHz (122 – 123 GHz); and
245 GHz (244 – 246 GHz)

are designated for industrial, scientific and medical (ISM) purposes. These frequencies may also be allocated to Short Range Device (SRD) services. Amateur operators must accept interference from ISM and SRD services within these frequency ranges.

4. Allocated to the amateur service on a temporary basis until further notice.

5. Telecommand and telemetry operation only.

6. Radiated power must not exceed 5 watts e.i.r.p.

7. Radiated power must not exceed 25 watts e.i.r.p.

8. The bandwidth of emissions must not exceed 200 Hz.

Dated at Wellington this 12th day of July 2010. SANJAI RAJ, Group Manager, Radio Spectrum Management, Ministry of Economic Development.

Explanatory Note

This note is not part of the notice, but is intended to indicate its general effect.

This notice:

1. Prescribes that, pursuant to Regulations made under the Radiocommunications Act 1989, a general user radio licence is granted for the transmission of radio waves by of communications in the amateur radio service, in accordance with the terms, conditions and restrictions of this notice. This notice comes into force on 12 August 2010.

2. This notice replaces the Radiocommunications Regulations (General User Radio Licence for Amateur Radio Operators) Notice 2010. The principal change from that notice is the deletion of the frequency range 928 MHz to 929 MHz from the Schedule.

CHANGE OF ADDRESS NOTIFICATION:

Please send to the Business Manager any details of your new address to retain your membership benefits.
Advise the Ministry of Economic Development (Radio Spectrum Management) or change your address online (refer Call-sign section).

REMEMBER: If you change your address you must notify the nearest office of the Ministry of Economic Development (Radio Spectrum Management), AND the Business Manager, NZART.

The NZART QSL Bureau is one of a network of approximately 170 bureaux established by the IARU to facilitate the exchange of QSL cards between NZART members and radio amateurs and listeners throughout the world.

Outward QSL cards

The service is free to both transmitting and non-transmitting members of NZART—**non-members** may make use of this service at a cost of **25c per card**. All QSL cards for forwarding to radio amateurs and listeners in New Zealand and overseas countries should be posted to: The QSL Manager, NZART QSL Bureau, PO Box 857, Wanganui Mail Centre, WANGANUI 4540. The call-sign of the station to which the card is addressed should be **printed clearly on both sides** of each card. Are you sending your card to a DX-station's Manager? If so, please write the Manager's call on the back of the cards. (Cards are sorted using the call printed on the back of the card.) If you see fit not to write the recipients' call-signs on the back of your cards, it is pointless to carry out the last instruction—we are not clairvoyants! When writing call-signs onto your cards, please take care with the forming of the letters and numbers. Make sure that the letter V will read V, not U, an "S" looks like an ess and not the figure "5" and vice versa, etc. This will greatly help the Bureau staff in their sorting! Remember also that

English is not the first language of everybody handing and receiving your cards!

Please sort your QSL cards into New Zealand call-district order (ie ZL1-ZL2-ZL3-ZL4), USA call-district order (USA prefixes are kept together—A-K-N & W1 cards all go to their First District Bureau; likewise all A-K-N-W2 cards go to the Second District Bureau and so on), and all others in alphabetical order: eg CE, EA, ES, EU, G/M, I, OK, S5, SM, UA, UN, UR, W1-W2-W3, etc, VU, ZL1-ZL2-ZL3-ZL4, 3D, 5W, 9A etc. **Please do not separate countries with rubber bands, strips of paper etc.**

Members must enclose a current year *Break-In* label with each posting. After complying with the above, sit back and be patient!

Inward QSL cards

The NZART QSL Bureau provides a **free inward service for all New Zealand amateurs and listeners**.

Collecting cards from the sub-bureaux by members and non-members

Please note that the four New Zealand sub-bureaux are arranged to cover the four mainland prefixes. A ZL1 living anywhere in New Zealand deals with the ZL1 sub-bureau, ZL2s likewise with the ZL2 sub-bureau, and so on through to the ZL4s. Supply your particular QSL sub-bureau (listed below) with a supply of suitable size self addressed stamped

envelopes (SASEs) to receive your incoming cards. Envelopes should be numbered and "Last Envelope" marked on one so that you are reminded when to renew the supply. Please make sure that you include your call-sign on the front of your envelopes as each sub-bureau only deals with call-signs and not with operators' names. Any specific requests for forwarding cards should be printed on the back of the envelopes: for example "send monthly" or "send when there are 10 cards" etc.

Some Branches have special arrangements for "Branch postings" in place with the appropriate sub-manager. Contact your local Branch secretary for information. (The possible provision of this service is totally the prerogative of each individual sub-manager and there is no compulsion on any person to be a party to any such collective scheme.)

QSL sub-managers

- ZL1: Mr Ian Walker ZL1BFB, PO Box 163060, Lynfield, AUCKLAND 1443
- ZL2: Mr A. H. Marr ZL2AGY, 8 Campbell Street, HAWERA 4610
- ZL3: Mr K. A. Holdom ZL4HU, P.O. Box 7, CLYDE 9341
- ZL4: Mr D. A. Adams ZL4OZ, 26 Wills Street, Balaclava, DUNEDIN 9016

Your QSL Card

- 1 Should not exceed 140 ×

90mm in size.

- 2 Have all the necessary information on one side of the card — if you intend having a two-sided card, make sure your call-sign is printed on **both** sides.
- 3 Use Universal Co-ordinated time (UTC) (formerly referred to as GMT, also referred to as Zulu time)—New Zealand Standard time (NZST) or New Zealand Daylight Saving Time (NZDT) is meaningless to 99.9 per cent of amateurs—and you do want a card back from them!
- 4 It is advisable to write out the name of the month to avoid confusion.
- 5 **Do not correct mistakes—make out a new card.** Altered cards are valueless to the recipient. Any further information concerning the business of the QSL Bureau, or requests for info on DX station QSL Managers/direct mail addresses (we will do our best to assist!) can be obtained from the QSL Manager at PO Box 857, Wanganui Mail Centre, WANGANUI 4540 or e-mail <zl2rr@xtra.co.nz>.

PS! Special calls and DXpeditions

If you, or your Branch, put on a special event/contest station using a special call-sign allocation for the duration thereof, or partake in a DXpedition, please notify the QSL Bureau Manager and supply him with the relevant QSL Manager info!



Devoted to Low Power Communication

Subscription; NZ \$28 a year. Banked to ASB account 12-3011-0984272 -58 <www.gqrp.com.>

Membership Secretary; Tony G4WIF g4wif@gqrp.co.uk, PO Box 298, Dartford, Kent DA1 9DQ, England.

Four copies of SPRAT magazines (Journal of the G-QRP-Club) posted every year and a copy of the Member's Handbook.
Editor Rev George Dobbs G3RJV.

Club sales of books, parts and back issues of SPRAT (CD ROMs available from Graham Firth G3MFJ)
13 Wynmore Drive, Bamhope, Leeds LS 16 9DQ, England. <G3mfj@gqrp.co.uk> Payments can be made in
New Zealand to the NZ Club Agent; Phil Tarrant ZL2NJ.

For more information contact Phil Tarrant ZL2NJ <philtar@xtra.co.nz>

SUSTAINING THE AMATEUR SERVICE

A Responsibility for all Radio Amateurs!

The amateur radio qualification is an achievable challenge for most people and is useful to career seekers in our technological world. It shows aptitude, a sincere interest in communications, and identifies an achiever. Which can give a jump over others in this competitive world. The late 1940s was a time with a wave of new entrants into amateur radio. Let us all try to promote a return to that level of interest! The NZART Council encourages newcomers into Amateur Radio. This calls for the help of all radio amateurs. As a challenge to all of us, the NZART Council has adopted the expression, "The New Wave", to embrace initiatives and objectives which will encourage new entrants to the world of amateur radio.

The NZART Constitution in its object statement says: "The objects of the Association shall be the maintenance and expansion of the Amateur Service in New Zealand by:

- a) the encouragement of recruits into the Amateur Radio movement
- b) the provision of guidance and instruction in radio techniques and operating

c) the promotion organisation and conduct of activities on a national and local basis ...", These objects are further reflected in wording in the NZART Strategic Plan, in particular Objective 2, which states:

"To promote knowledge of amateur radio and encourage newcomers.

To assist Branches in local activities, especially in schools.

To provide education and training aids.

To award suitable prizes and other recognition."

And, in the plans of action:

"To publish information in Break-In, training materials and aids, educational and publicity material."

The NZART Strategic Plan Objective 3 states: "To provide guidance and instruction in radio techniques and operating, and encourage practical experimentation."

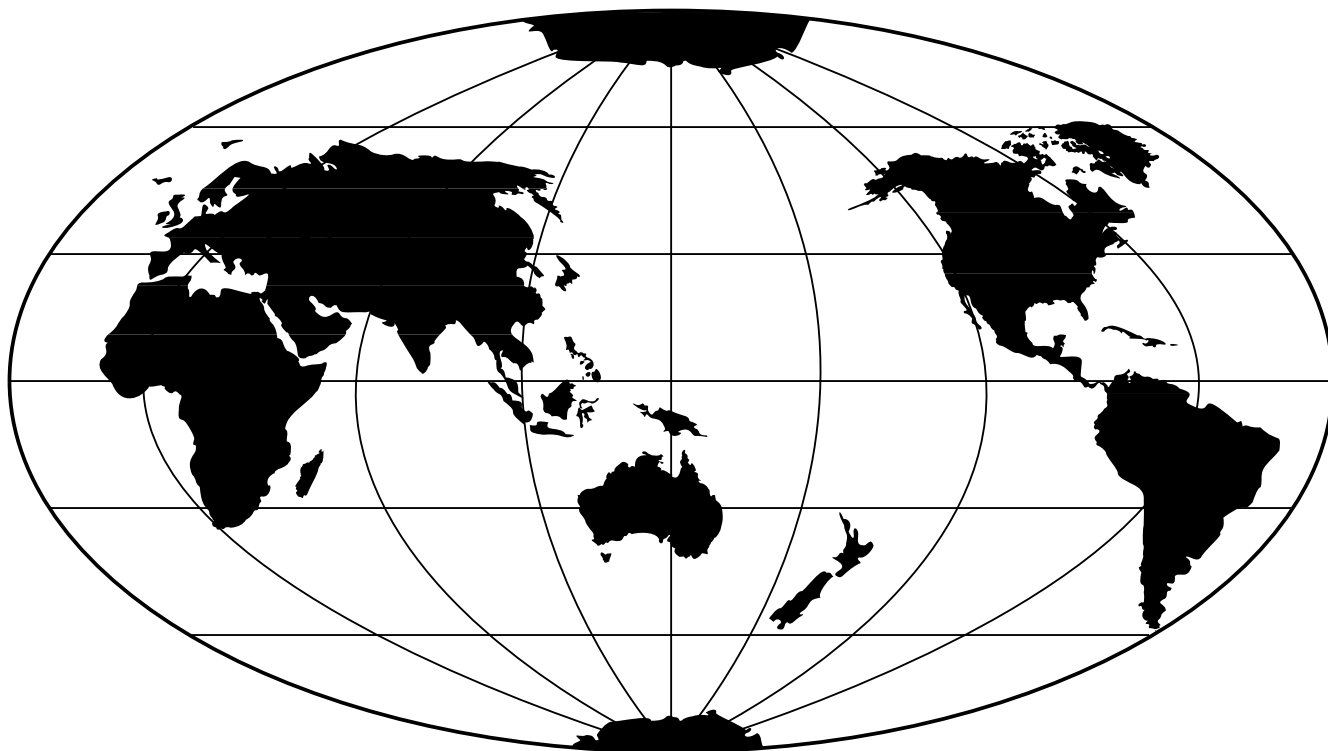
With your guidance and your help, others too can experience the thrills of Amateur Radio. Active encouragement and support are sought from all NZART members and Branches to recruit newcomers and to run classes in preparation for

the amateur radio examination. Branches are encouraged to actively promote Amateur Radio. Master copies of brochures, posters and other leaflets and publicity material are available to Branches free of charge, from NZART Headquarters.

A sticker is available to NZART members from NZART Headquarters for 50c each. This is for displaying in the rear window of vehicles to show your support in a national campaign to increase the awareness of Amateur Radio in the general population. Many computer users are unaware of amateur radio and what it has to offer. You are encouraged to widely advertise the NZART World Wide Web page, <<http://www.nzart.org.nz>>

Simple-to-construct equipment is a way to show youth groups and other interested persons the fun of Amateur Radio. Show how inexpensive home-construction brings delight and excitement from the achievement of communicating without wires over long distances using self-built gear. Articles from Break-In may be freely photocopied and distributed for this purpose. Do you know anyone who has shown

interest in Amateur Radio? A youth or grandchild perhaps? Spread the word by demonstration! After passing the amateur radio examination, a call-sign that is unique world-wide is issued by the Ministry of Economic Development. The challenge to attain such an identifying callsign brings its own rewarding fun. A local "group project", with the challenge to interest newcomers to develop their own local on-air amateur radio net, is worthy of consideration and encouragement. Construction of receivers, transmitters and other projects under the guidance of experienced constructors at "club workshop nights" is a worthy Branch activity. Each Branch should appoint an "NZART Agent" as one of their executive, the task being to gain increases in NZART members, both Transmitting and Non-Transmitting, in their local areas. A national and concerted effort by all New Zealand Radio Amateurs to promote Amateur Radio is necessary to ensure the continuation of a healthy and vigorous Amateur Service. Help bring the "The New Wave" of radio amateurs!



A GUIDE TO VHF AND UHF FOR NEW LICENSEES

Jane Atkinson ZL2QO, Jim Meachen ZL2BHF, Stephen McNeill ZL4HG

This article has been prepared by those listed above on behalf of the Wellington VHF Group, Branch 74 NZART (Inc.), PO Box 12-259 Wellington, to offer guidance to the newcomer to the wonderful world of amateur radio.

"Sam the Mobile Man" guest appearance courtesy of Sue Lill

© August 1994

Why such an article?

You've just got your licence. Your new rig has arrived today and is ready for use. You turn the power on. So, what do you do?

It can be pretty daunting when you first start out knowing what to say, or what not to say.

This article is designed to help you through your first few contacts. It's important to remember that there are no fixed rules. Many of the observations that are made in this article are the result of experiences we have had over a number of years, and you must remember that your operating may not necessarily cover what we've been interested in. So be it. This is a guide. Use it as a kind of à la carte offering of ideas.

The only way to become familiar with the operating procedures on VHF or UHF is to spend some time listening to the good operators, noting how and why their methods succeed where those of the poor operator do not. It is quite important as newcomers that you should be discriminating in this respect, and not simply mimic what you have heard when going on the air for the first time. To summarize, copy the good operators, and not the bad ones!

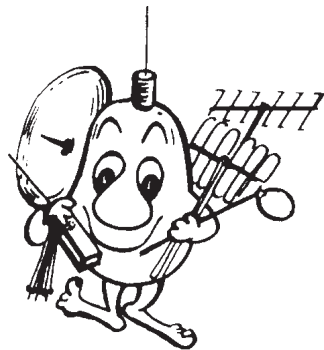
How this article is written

The article covers

a number of different facets of amateur radio that you are likely to encounter in the VHF spectrum. You'll find these

are often the same ideas you'll use on HF, but that kind of operating is beyond the scope of this article. You can find some excellent books on the general topic of operating, and you're encouraged to seek out the information contained therein. Some good examples of operating books, all of which can be obtained from NZART Headquarters, are as follows:

- ★ A Guide to Amateur Radio, Pat Hawker G3VA, RSGB, Ninth Edition.
- ★ Amateur Radio Operating Manual, R. J. Eckersly G4FTJ, RSGB, Third Edition.
- ★ The ARRL Operating Manual, edited by Robert J. Halprin K1XA, ARRL, Third Edition.
- ★ AREC Manual, NZART, 1978.



Some terminology

There are lots of words that are used everyday in the world of VHF in amateur radio. Among the most common are as follows:

AM Amplitude Modulation. A method of voice encoding a transmission which is seldom used these days. Specifically the strength of the signal transmitted varies with the strength of the voice signal.

AMSAT Amateur Satellite Corporation. An amateur radio organization promoting and developing the amateur satellite service. Over two dozen satellites have been built by amateurs worldwide and are universally available.

APRS Automatic Position Reporting System. An amateur radio based automatic position reporting system for tracking and digital communications.

AREC Amateur Radio Emergency Communications. Groups of amateurs within NZART Branches who provide emergency communications in conjunction with other organizations as the situations demand.

ATV Amateur Television. The transmission of video signals by radio amateurs. This transmission can sometimes take place through a special kind of repeater.

Autopatch A device for interfacing a repeater to a telephone line. Such a device responds to audio tones generated by a telephone touch-tone pad connected to the user's rig or microphone.

Break The word used to interrupt a conversation on a repeater, often to indicate there is an emergency.

Call Book An annual publication by NZART that contains amateur call-signs, frequency allocations, repeater maps and other vital operating information.

Channel The pair of frequencies, input and output, used by a repeater.

Clear Indicates the end of a contact.

Coverage area the geographic area within which a repeater provides communications (sometimes called the footprint).

CQ A general call made requesting someone to talk to.

CTCSS Continuous Tone Coded Squelch System. (Sometimes known as PL or Private Line.) A sub-audible tone system used when you want to activate just one or a small number of remote receivers.

CW Continuous Wave. Commonly known as Morse code. Used in weak signal or long distance applications and sometimes in conjunction with amateur satellites. This is an "on-off" or dot-dash type of transmission.

Data repeater A repeater specifically designed for use in passing data, rather than voice communications. Of course, it may be used for both.

Digipeater A Packet radio repeater. Packet radio is a form of data transmission. Voice cannot be transmitted through a digipeater.

Dropping out The situation that exists, while you are using a repeater, when your signal does not quite have enough strength to keep the repeater triggered (see "Trigger").

D-STAR Digital Smart Technologies for Amateur Radio. This is a digital voice and data protocol specification developed as the result of research by the Japan Amateur Radio League to investigate digital technologies for amateur radio.

DTMF Dual Tone Multi Frequency. A system often used for repeater control, using two tone frequencies. This control is often achieved by a simple keypad on your microphone or rig.

Duplex A mode of communication in which you transmit and receive simultaneously.

EchoLink A computer based Amateur Radio system that allows radio amateurs to communicate with one another using Voice over IP (VoIP) technology on the internet for at least part of the path between them.

FM Frequency Modulation. A method of voice encoding a transmission, which is frequently used in conjunction with repeaters. Specifically the

strength of the signal transmitted is constant but its frequency varies with the strength of the voice.

FTMAG Frequency Management and Technical Advisory Group. A group that advises NZART on technical matters, particularly those relating to VHF and repeaters.

Full quieting A received signal that contains no noise.

Handheld A portable receiver that is small enough to fit in the palm of your hand.

Handle This refers to your name. Note, the term "personal" is not generally used in amateur radio.

Horizontal polarization The nominal orientation that a radiowave is taken to have as a result of an aerial's physical layout and orientation. Horizontal polarization is by convention very often used in weak signal applications at VHF/UHF.

Input frequency The frequency that the repeater receives on, and also the frequency on which you transmit to the repeater.

IRLP Internet Radio Linking Project. A project that links amateur radio stations around the world by using Voice over IP (VoIP). Each gateway consists of a dedicated computer running custom software that is connected to both a radio and the internet. This arrangement forms what is known as an IRLP Node.

Magnetic mount (Also **Mag Mount**) A mobile antenna with a magnetic base that enables quick installation and removal from a car.

Ministry of Economic Development (Radio Spectrum Division) Ultimately responsible for the administration of all the radio frequency spectrum in New Zealand.

NiCd (also **Nicad**) A Nickel-Cadmium battery that may be recharged.

NZART New Zealand Association of Radio Transmitters (Inc). New Zealand's national amateur radio society, PO Box 40-525, Upper Hutt.

Offset The difference between a repeater's transmit and receive frequencies. In New Zealand this is plus or minus 600 kHz on the 2 m band and 5 MHz on the 70 cm band.

Output frequency The frequency that the repeater transmits on, and also the frequency on

which your receiver receives the repeater.

Over The word used to indicate the end of a voice transmission.

Packet radio A way of transferring data or messages between amateurs across town, about the country or around the world.

Phone patch A device for interfacing the audio input and output of a radio transceiver to a telephone line.

RDF or DF Radio Direction Finding. The amateur technique of locating a transmitter.

Repeater trustee Person elected by an NZART Branch to take responsibility for proper operation of a repeater.

Roger The word that indicates all information was received correctly.

SAR Search And Rescue.

Simplex A mode of communications where you transmit and receive on the same frequency.

Sked A pre-arranged radio contact between two or more stations.

SSB Single Sideband. A method of narrow band voice encoding commonly used for long-distance or weak signal communications in both the high Frequency (HF), VHF and UHF parts of the spectrum. Very commonly used in conjunction with amateur satellites.

STSP Repeater Short Term Special Purpose Repeater. A repeater designed for emergency use or during special events.

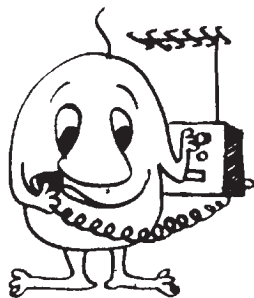
Tone pad A device that is used to generate a standard set of tones that can be used to control certain functions on a repeater, or remote equipment (see DTMF).

Triggering To activate a repeater by transmitting on its input frequency.

Vertical polarization The nominal orientation that a radio wave is taken to have as a result of an aerial's physical layout and orientation. Vertical polarization is by convention very common in repeater operation at VHF/UHF. Antennas on handhelds when held upright and on cars are vertically polarized.

NZART

The New Zealand Association of Radio Transmitters (Inc) is New Zealand's representative society for radio amateurs. It provides a wealth of services to assist both the new and established amateurs. It publishes a monthly magazine (Break-In) and an annual Call Book. It represents the interests of amateur radio at both the national and international levels. It is controlled by an Executive Council elected by members. It has over 80 Branches



throughout New Zealand, and has a membership of over 3000 amateurs.

One of the services that is provided by NZART is the planning of band usage and the national co-ordination of repeaters and beacons. It does this based on the recommendations of its Frequency Management and Technical Advisory Group (FMTAG).

Inquiries about NZART services and membership may be directed to:
NZART Headquarters
PO Box 40-525
Upper Hutt

Establishing a call

There are two accepted way of establishing contact with another station. The first method is to put out a general call to all stations, known as a "CQ", and to hope that another station responds. The second is to call another specific station by prior arrangement, known as keeping a "sked", or after the other station has just finished a contact or called CQ. CQ calls are not normally made through repeaters. Instead, stations announce that they are "listening" on the repeater. For example, you might say: "This is ZL2BHF listening seven-ten."

To start a sked with another station, you will call the other station by its call-sign, followed by your own call-sign, such as: "ZL2QO, this is ZL4HG."

The station that is being called might have his or her call-sign repeated a few times, just in case they don't hear the single call. You might also be wise to issue your own call-sign in phonetics so that there is no mistake who you are. For example:

"ZL2QO, ZL2 Quebec Oscar, ZL2QO, this is ZL4HG, ZL4 Hotel Golf, ZL4HG."

However, remember that phonetics really only need to be used to clarify who you are in conditions that might make certain letters ambiguous, or where the band is noisy, or where your signal is likely to be weak. Over-use of phonetics is rather annoying, and time consuming.

Answering a call

You answer a CQ or sked call

from another station in the same way that you would make the sked call in the first place. For example, in the above instance, where ZL4HG is trying to call ZL2QO, the latter station might answer the call in the following way:

"ZL4HG, this is ZL2QO ..."

and the conversation would continue. It's that simple!



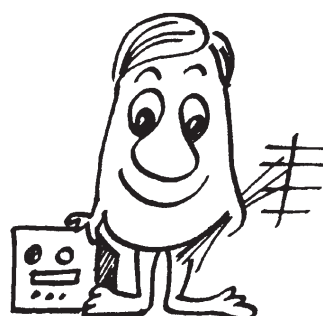
How to pass transmission to another station

When you have finished saying what you want to say on one transmission, and you want the other station to reply, you do so by simply saying the word "over".

Before you say the word "over", you may want to indicate the other station's call-sign, and your call-sign too, in that order. Note that it is not absolutely necessary to give both call-signs at the beginning and end of each and every over, your own call-sign will suffice. But, if you do give the call-sign, you must give the full call-sign, not an abbreviated version. For example, use "ZL2BHF" and not "2BHF" or "BHF".

Letting other stations in

If you are in the middle of a conversation, and a station transmits his call-sign in the pause between transmissions, the next station in the queue to transmit should acknowledge that station and permit him or her to make a call and join the conversation. It is not polite to ignore him and, furthermore, it is rude to acknowledge him but not to let him speak. You never know, the calling station may need to use the repeater immediately. He may have an emergency on his hands, so let him make a transmission promptly.



Joining an existing conversation

If you wish to join a conversation that is already in progress, transmit your call-sign between transmissions. The station that transmits after you drop in your call-sign will acknowledge you, and usually invite you to transmit.

A brief pause, say three seconds, before you begin each transmission allows other stations to participate in the conversation. So don't transmit immediately that the other station stops. If you begin transmitting too quickly, you can prevent other stations from getting in. Also, there might be an emergency, so leave a pause!

Before you join an existing QSO, stop and think, "is it appropriate for me to join in?". If it's a technical matter and you know something about it, it's probably all right. If it's on a more personal level, it might be better to wait until they have finished before giving a call, unless you know them fairly well. Either way, just give your call-sign and wait to be invited in. Jumping straight in with your comments is no better manners on the air that it is in person.



How to tell when it's your turn to talk

The station with whom you are talking will pass transmission back to you by one of the methods outlined above. Remember the pause before you transmit!



When and how often to give call-signs

A major source of frustration and annoyance to many operators can be the excessive use of call-signs. Take this example:

"ZL4 HG from ZL2BHF, are you parked yet Stephen? Over."

"ZL2BHF from ZL4HG. Yes. Over."

"ZL4HG from ZL2BHF, OK I'll see you later. Over."

"ZL2BHF from ZL4HG, over where, over."

We suggest you identify yourself at regular intervals, say once every ten minutes, as well as at the beginning and end of a conversation.

Standards of language, and topics best avoided

Acceptable language should be used at all times. Even what seem like mild expletives can cause offence to some people, and may pave the way for worse behaviour

from others.

Whatever bands, mode or type of operating one is undertaking, there is a fundamental point to remember. That is that the "private" conversation with the other station is actually in public. Never discuss emotive subjects, such as politics, race or religion over the air to avoid the possibility of giving offence to others. Never give any information over the air which might be of assistance to the criminally inclined, such as the time that a house is unoccupied, dates of holidays, and valuables in the house. Telephone numbers, especially those belong to others, should be handled with considerable discretion.

Unidentified transmissions

Occasionally you may hear a conversation that you think you can enhance with a suitably witty addition, suitably anonymous. Don't be tempted to do so! All transmission must be identified! If you hear someone who appears to be a pirate, or who might perhaps be trying to bait the users of the frequency, don't rise to the bait—just ignore them. They will soon become bored and go away.

List of commonly heard Q Codes

Q Codes were originally developed for use with Morse code, to speed up the sending of commonly-used phrases. They are not strictly necessary when carrying on a voice contact, since it is usually just as quick to use the ordinary English equivalent: eg "Go to six-five-two-five" instead of "QSY six-five-two-five". However, some Q Codes are still used quite a bit on VHF and UHF. The more commonly used ones are:

QRM Interference
QRN Static
QRO High power
QRP Low power
QRT Cease transmitting
QRX Stand by
QRZ Who is calling? Who is there?
QSB Fading
QSO Contact, conversation
QSY Change frequency, go to
QTH Location

What a repeater is and how it works

A repeater is a special kind of transmitter and receiver combination that receives a signal and simultaneously retransmits it. A repeater situated on a vantage point such as a hilltop can dramatically increase the range of VHF and UHF communication in hilly areas and for users of low-power transceivers such as handhelds. To prevent the

repeater from becoming unusable due to feedback, the receive and transmit frequencies are different. The difference between the two signals is known as the offset or split (see definitions).

To access a repeater, an amateur transmitter has to be set up so that it transmits on the repeater's input frequency and receives on the repeater's output frequency. Most (but not all) repeaters continue to transmit a carrier (known as the "tail") for a few seconds after the input signal ceases, so that the user can check that he or she is actually accessing the repeater. A list of repeater frequencies is given in Section 7 of this Call Book.

In New Zealand all repeaters are "open", that is, any licensed amateur is permitted to use the repeater without necessarily being a member of the local club. This is not necessarily the case in other countries.

Repeater timeouts

Some repeaters incorporate timing devices. These prevent an over from lasting longer than the time that the repeater is set to, usually two or three minutes. If a station transmits for longer than this, the repeater will cease retransmitting after the allotted time is up and a deathly hush will descend upon the frequency. The repeater timer resets when a new transmission begins. Two repeaters that currently incorporate this feature are Motueka 670 and Manawatu 910 (part of the National System).

Repeater alarms

Some of the more sophisticated repeater systems incorporate alarms to warn users of such things as power failure. Usually some kind of tone or signal will appear briefly at the end of each over.

The signal that appears after each transmission on Blenheim 695 is not an alarm but an identifier. It transmits the characters "BM" in Morse.

If you hear an alarm signal, first make a note of what type it is. If it is a digitized voice, what it is saying? Notify the repeater trustee as soon as possible (within reason—phone calls at 3 am are unlikely to be appreciated). If you don't know who the trustee is, get in touch with a committee member of the branch responsible for the repeater.

Most mains-powered repeaters have battery backup systems so that they can keep going if the power fails. As the repeater might have to remain on emergency power for some time, it is best not to use the repeater unless

you really need to. Conserve emergency power for emergency use.

DTMF and CTCSS control codes

Some repeaters will respond to DTMF tones (see your transceiver manual to determine if your set can generate these tones). These fall into two main types: codes for use only by trustees for controlling repeater functions, and codes for use by amateurs in general. The most common in the latter group is the signal strength report generator. If a certain sequence of DTMF tones is transmitted, the repeater will respond with an indication of the signal strength it has received. The sequence of tones and the type of response received will vary from repeater to repeater. One thing remains constant with all of them: the need to IDENTIFY YOURSELF. Something along the lines of "This is ZL2BHF testing" is usually sufficient.

The uses of continuous tone coded squelch system (CTCSS) are many and varied. It may be used, for instance, by one station to contact a second without the second station being disturbed by other stations on the frequency. This may be useful when a station is waiting for a specific station to talk, but it is not the way most of us operate. A second use of CTCSS is as a warning that your station is being called, without necessarily locking out other stations. Manufacturers offering CTCSS facilities on their rigs often do so in a way that makes these facilities specific to their products; this may limit the usefulness of this feature. So, you should consult other amateurs before you use these facilities.

The National System

The National System is a series of dedicated linked high-quality repeaters on the 70 cm band. When a station accesses one of these repeaters, the signal is relayed to all other repeaters in the System and can be heard simultaneously up and down the country. For example, a station with a handheld in Wellington can talk via the System to a station in Auckland as if he or she were in the local region.

Guidelines for repeater use

Your local repeater will be monitored by more people than any simplex frequency, both by amateurs and non-amateurs. For many people it will be the only one they use—if it is occupied they will not be able to go to another one in the same way that another simplex channel can be used if one is busy. Therefore,

extra courtesy and consideration for others is warranted.

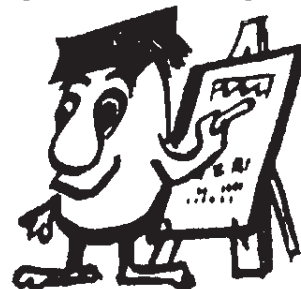
Pay attention to good operating procedures—other listeners need to know what is going on. They will particularly want to know if a contact has been finished, so that they can use the repeater without worrying about getting in the way of someone else's conversation. Keep in mind at all times why the repeater is there. In most cases, this will be voice communications. Non-voice modes on a voice repeater are not usual practice unless there are special circumstances—which usually means having discussed it previously with the repeater trustee. Digital modes (RTTY, AMTOR, Packet) are especially annoying to listen to and, of course, can't be deciphered without specialized equipment.

Voice on data repeaters (not digipeaters) is considered OK if that repeater is the only one you can use to make contact. It's probably best not to make the QSO any longer than absolutely necessary; you will no doubt reach this conclusion fairly rapidly yourself once the data starts coming in over the top of your transmissions!

One way use (ie, where one or more stations are not heard on the repeater output) is not advisable. A quick call to request another station to go to another frequency is OK, but it is inconsiderate and confusing to others to keep up a one-way contact for any length of time. Use simplex and a dummy load where possible for the alignment and preliminary testing of equipment. Avoid the use of repeater input frequencies for this purpose.

NZART co-ordinates the repeater system and will generally only accept proposals for repeaters that meet the guidelines commonly accepted in New Zealand. The FMTAG is responsible to NZART for the maintenance of repeater technical standards and recommended channel allocations. All repeater systems in New Zealand require a licence from the New Zealand Radio Frequency Service.

Bear in mind that all the comments above apply specifically to New Zealand repeaters and there may be marked differences in the operation of overseas repeaters



and the procedures which you must use to work with them. Amateur radio is "on display" on repeaters more than anywhere else. Try to create as good an impression as possible.

Phone patches

Radio regulations and licence requirements should be carefully observed when using a phone patch. Non-amateurs are not permitted to control an amateur station. Normal traffic handled is "brief personal" messages, not business or commercial, and ONLY within New Zealand.

Phone patch equipment requires proper authorization to permit its connection to the public switched telephone network.

Packet radio

Messages sent via Packet radio should be in the spirit and tradition of amateur radio and meet the requirements of the Radio Regulations.

Care should be taken when distributing hardware, software or publications via Packet radio as it may be interpreted by others as advertising or infringing the copyright of material originated by others.

Priorities on repeaters

Repeaters allow mobile and portable stations away from the luxuries of mains power supplies and sophisticated antenna systems to increase their range. Another important purpose is to facilitate emergency communications.

Amateur Radio Emergency Corps (AREC) operators are distinguished by the use of E (emergency) call-signs, for instance ZL2EMA. If you hear these stations, give them priority.

Portable stations are those who are operating away from home, for example, a holidaymaker at a motor camp or a tramp in the ranges. They will identify themselves by using the word "portable" after the call-sign, eg: "This is ZL2QO portable listening seven-one-seven-five." If you hear these stations, give them priority—they may not have access to a telephone and could be needing to relay an urgent message. Mobile stations are actually on the move at the time of transmission. They may quite often be heard on their way to and from work at peak hours, and will identify themselves by saying: "This is ZL4HG mobile seven-ten." There are all sorts of variations on this basic theme, such as "pedestrian mobile" (on foot), "train mobile", "maritime

mobile" (all at sea?) and even "stationary mobile"—surely a contradiction in terms if ever there was one! Mobile stations may need to report breakdowns, traffic delays, traffic accidents or other urgent/important pieces of information, so should be given priority if heard.

Usually a mobile or portable station will not hog the repeater but will be listening for other stations who may need to use the frequency. With a little give and take there is plenty of room for all.

STSP Repeater

(Short Term Special Purpose repeater). A repeater designed for emergency use or during special events. An example is perhaps the need to provide communication for some local public event. It's important to note that the frequencies that protected so that the repeaters can be moved about with little chance of interference with other repeaters.

The three second rule

Three seconds should be left between each over to allow other stations to access the repeater. If another station calls, let them in straight away—they may have an urgent message to transmit.

Long QSOs on repeaters

Lengthy conversations on repeaters need to be approached with care. It would not be very thoughtful to tie up a repeater for a long time during rush hour or early evening when other people are likely to be wanting to use it. Late at night is best. Where available, a 70 cm repeater that's not part of the National System might be a better choice if there is less traffic on that band and less likelihood of getting in someone else's way. Make sure that you leave three second gaps for other traffic, and it may also be a good idea to leave longer gaps, such as 10 seconds, every so often. Bear in mind, too, that even though you may make every effort to allow other stations to use the repeater if they need to, many people would rather wait until you have finished altogether. If possible, break the conversation up into two or three shorter contacts and leave the repeater free in between them.

More of a nuisance than long QSOs are long overs, especially when there are inadequate gaps between them. At busy times, keep the overs short so as to allow others, possibly with

urgent messages, to access the repeater

Checking the repeater input signal

Most radios these days have a setting called "repeater reverse", "monitor" or something similar which allows the operator to check the repeater input signal, ie, the frequency the other station is actually transmitting on. If you can hear this signal, it is a good indication that simplex contact with the station is possible.

Using simplex

Home station to home station contacts should be made on simplex where possible, thus leaving the repeaters free to facilitate mobile and portable communication.

Simplex is like carrying on a conversation at the back of a

room: although fewer people will hear it, it is still not private. The same standards of language and content apply regardless of frequency.

There are eight designated FM simplex channels on both the 2 m and 70 cm bands. A list of

simplex channels is given in this Call Book.



Channel terminology

Channels or frequencies that are used on VHF/UHF are not normally named by all the numbers that make up the frequency. Instead, it is more common to use an abbreviated form of frequency for convenience. For example, the common simplex frequency of 146.525 MHz is referred to as six-five-two-five, where the rule is to omit the first two digits and the decimal point. The exception to this rule is where the frequency ends in zero, in which case the zero is omitted. For example, the frequency 147.000 MHz is referred to as seven-hundred, not seven-thousand.

Simplex and repeater signal reports

Many transceivers incorporate a signal strength meter (often called an S-meter). When you are listening to a transmission on simplex, the S-meter reading will give you an indication of how strong the station's signal is. With a repeater, the situation is quite different. The repeater signal strength remains constant, regardless of the transmitting station's signal strength. The degree of signal quieting varies instead—a strong input signal produces a clear, noise-free repeater output—described

as "fully quieting" or "fully limiting"—while a weak signal will be noisy. If a signal falls below a certain level, it will not hold the repeater reliably but will pulse it intermittently or drop out altogether.

Please remember that other stations rely on signal reports to determine how well their setup is working—try to make your signal reports as accurate as you can.

Other modes

FM is not the only mode used on VHF and UHF, in fact almost any mode can, and often is, used on these bands. For example, singleband (SSB) is used for weak signal and long-distance work towards the bottom end of the 2 m band. By contrast, CW or Morse is used for very exotic work such as earth-moon-earth (E-M-E) communication. As on all bands, you choose the mode that best suits your application and your desire for experimentation. You should be aware that many of the conventions we have outlined above for repeater operation may not necessarily apply to some of these exotic modes. As an extreme case, in E-M-E operation contacts are highly structured, based on very severe time constraints. The precise procedures for all the modes are beyond the scope of this article. They are covered in the recommended references.

The 6 m band

The 6 m band (50–54 MHz), lying between the highest high-frequency band and the 2 m VHF band, provides some exciting scope for experimentation into unusual modes of radio propagation. Communications over several thousands of kilometres is possible under favourable conditions, while at other times the band can seem dead.

This band lies close to the television Channel One, even overlaying part of this channel. For this reason a special MoC permit is required for operation in part of this band. You should consult a local Branch of NZART, FMTAG or known 6 m enthusiasts for details on the specific procedures before you begin operation.

Summary

Most of the special points relating to repeater use come under the category of commonsense considerations for others.

The Amateur's Code, first published in the ARRL Handbook, and reprinted in this Call Book, sums these up succinctly and we can do well to bear it in mind at all times.

On 17 June 2004, the Morse test was abolished as a requirement for the New Zealand Amateur license. It had been there from the very beginning, since the first Radio Regulations were Gazetted in 1923. Over the years, the speed required fluctuated, increasing to a high of 15 wpm for a "High frequency permit" in 1945, then dropping to 12, then finally to 5 wpm in December 2001. Its passing into history was viewed with regret and sadness by some, and with relief by others. But Morse will never die, and there will always be many who use it for contests and difficult DX contacts, and who prefer it to all other modes for its simplicity and beauty.

For those reasons, and because it played an overwhelmingly important part in our history, I recommend that you at least try it.

But despite what old timers may say, very few of us found learning to copy Morse code easy. Historical research shows that learning to copy 12 wpm requires an average of about 70 hours of study, but there are wide variations. On average, about 10 per cent of learners manage it in 10 hours or less, and another 10 per cent take more than 150 hours. A very few never achieve it no matter how long they persevere, and I am convinced that this is because they genuinely cannot not "make sense of the sounds" at all.

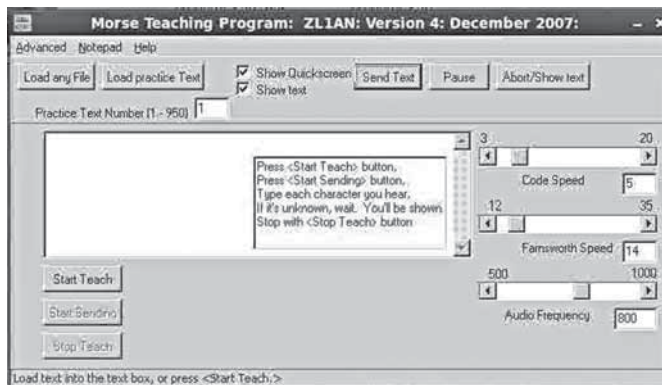
This should not surprise us. Some people are tone deaf, some cannot learn foreign languages, and some never get the hang of algebra. "Morse ability" seems to be little correlated with intelligence, musical ability, sex, age, or high achievement in other areas.

What is the "right way" to learn? All authorities agree that the very worst thing you can do is to memorize the code symbols from a printed chart. If you have one, never look at it again! Morse is an aural language, and must be learned by listening. This may surprise you, but the evidence is extensive and irrefutable.

I'm personally convinced that the very best way to learn is from a well-written computer program. Computers are patient, non-judgmental, and very good at keeping statistics.

A free program, written specifically for ZL learners, is available for downloading from the NZART website^[1].

You'll need a PC running Windows 95 through Windows 7. The methods used are based on scientific research, with



algorithms honed by feedback from users over 20 years. I know that it teaches Morse better than I can, and has got many people through Morse tests in several countries. If you have access to a computer, get it, and try it. Here are the download instructions:

- Go to the NZART website^[1].
- Click the link to "Exam information".
- Near the bottom of the page, in the text at item number 5, you'll see in the section "Learning the Morse Code", a green box saying "Teaching Software Filename:"
- Click on the blue words "instal-teach4.exe". You should be asked if you wish to save the installation file. Click "yes". It will come.
- Run the file. The program will install and start.

If you don't have a computer, your local NZART Branch may. In fact, these days older, used computers are so cheap that EVERY branch should have one for Morse practice, and for members to check out other Ham software.

There are other programs available, but some can't be recommended. If you have one that

- shows you visual symbols of the code
- teaches "opposites" (like "r" and "k") or "series" (like "eish5")
- gives only "random group" practice
- does not give you an ordered structure for learning
- teaches you to pass the US, UK or Canadian tests (which have a different format)
- sends characters at a speed less than 12 wpm

delete it immediately. A picture of the recommended program's operating window is shown in the figure. Everything is done by pushing buttons, as described in the comprehensive "help" file supplied. This tells you exactly how to start, continue, and work up to a reasonable operating speed.

"Farnsworth" Morse is used throughout, and should always be used for learning. This mode is named in honour of Russ Farnsworth, an early teacher who popularised the method, though he was not the first to use it. Characters are sent at a faster rate than for "correct" morse, with longer gaps between, to reinforce the learning of characters as "complete sound sequences", and not as an individually-perceived dits and dahs. Failure to teach this way is now recognised as the reason for the infamous "plateaus" that learners reached around 10-14 wpm, which old-timers mutter darkly about. Using Farnsworth Morse, this plateau is eliminated. The next one most people strike isn't usually reached until around 40-50 wpm!

However you proceed, you should learn the numbers at the same time as the letters. If you leave them "until later", they'll be harder because you won't have practiced them as much.

The program recommended above implements all of these features. The initial character teaching process is aural, and adaptive, with characters introduced at a rate governed by your own response from the keyboard, reinforced by a histogram display showing your progress. Several sessions will be necessary for this, but the program will give you a progress report at the end of each one, and you'll probably be surprised to see your ability continually improving.

Having learned the characters, 900 plain-language texts, similar to the old test texts, are provided for practice. Now you can start to write down the text. I recommend starting at an overall speed of 3 wpm, with Farnsworth speed 14 wpm, which gives you about two seconds "thinking time" between characters. Increase the overall speed as you gain proficiency, and when this reaches 14 wpm, you'll be hearing "correctly-spaced" Morse. As well as these texts, 50 "sample QSOs" are provided to help you get used to what you'll

hear on the HF bands.

Start sending practice only after you have the correct sound and rhythm of the characters firmly imprinted in your mind. Most of the candidates I examined in the last years of the Morse test had great difficulty attaining acceptable sending, because they started with the wrong grip, and sent with finger instead of wrist movement. A recommended procedure is given in the "Help" file of the teaching program above.

However, it's also helpful to see the correct way in use. An excellent YouTube video by a Japanese operator^[2] shows you one method of learning, and what good code sounds like. He uses the "European" type key having a heavy, straight bar in common use in ZL. The "American" key, with slimmer, bent bar requires a different action. Many other videos show on the same page, some much better than others.

Many have found it helpful to just listen to audio Morse while driving or doing the dishes. A virtually unlimited supply of this can be created with the free computer program "ebook2CW"^[3]. This creates MP3 files from public-domain "ebooks" accessed by links on the same website. These include the complete works of Shakespeare!

Several excellent free Morse reading computer programs can also be downloaded from the web^[4]. All these require reasonable code, good signal strength, and little fading and interference to decode well, but many have found that watching the words form on the screen while listening to them aids the learning process.

It's still possible to learn as we all did in the old days, by listening to Morse practice sessions on the local repeater, or on the bottom end of 80 m if you have an HF receiver. Listen around between 3.550 and 3.650 MHz between 7 and 8 pm for a week, and you'll probably hear some. They're easy to recognise because slow Morse is sent for a few minutes, followed by a "read-back" by the control station, and questions and comments by listeners.

How long, and how frequently, should you practice? Half an hour per day is fine. Some people find that before breakfast, when the mind is fresh, is better than in the evening. Others find that two or even three 20 minute sessions per day work best. In any case, stop when your mind begins to wander, or if you feel you're getting overwhelmed.

When you can cope with 10–12 wpm, try to have at least a few contacts on the air. Your reading doesn't have to be perfect! Most of us miss some characters or words because of conditions, or because the other operator goofs. You may find that CW becomes quite fascinating. You'll begin to recognise the different morse rhythms sent by straight keys,

bugs, keyers and the keyboards of the high-speed merchants, and learn to recognise the distinctive "fists" of regular operators—which become as distinctive as voices. You'll find that DX contacts with foreign stations are easy. Everybody has enough basic English for a CW contact, and many foreign stations operate almost exclusively on CW.

You'll also begin to find that you can read Morse faster than you can send it on a straight key. This is the time to invest in an electronic keyer and paddle. It is easy and cheap to construct a keyer yourself, using one of the many microprocessor-controlled chips available on the web. Paddles are not cheap, but again, you can make one yourself.

References:

- 1 The NZART website is <http://www.nzart.org.nz/index.html>
- 2 View the video at <http://www.youtube.com/watch?v=ncOcgArGJHI&feature=related>
- 3 Download "ebook2cw" from <http://fkurz.net/ham/ebook2cw.html>
- 4 For code reading programs, see <http://www.dxsoft.com/>

THE FIRST CW QSO

by
GARY BOLD
ZLIAN

If you learned Morse from "plain language" English texts without doing much, or any, listening on the air, listening to real Ham CW conversations is initially a perplexing experience. It takes some time to get used to the conventions, the Q codes, the abbreviations, the background noise, and the interference. After a while, however, you'll realise that the first few overs are usually very stylised, especially between stations who have not made contact before. The "standard information" (name, QTH, signal report, maybe power, rig, antenna) is always exchanged in a similar manner, and critical bits are always repeated. Only after a couple of overs does the conversation become less formal, but even then most of us follow patterns.

How should you go about it?

Here are some suggestions

For your first QSO, it's a good idea to arrange a contact with some experienced local who will send good, slow Morse, with a strong enough signal to overcome the noise — which can be quite unsettling if you have listened only to noise-free code sent in practice sessions. During the contact, practise by sending the standard information just as you would to an unknown operator. Here is how the conversation might go. I have included the abbreviations you'll hear frequently, and which you'll need to become familiar with.

ZL1XYZ ZL1XYZ DE ZLIAN ZLIAN K ZLIAN DE ZL1XYZ—GE OM ES TNX FER CALL — RST 589 589 — NAME HR FRED FRED ES QTH HAMILTON HAMILTON HW K?

ZLIAN DE ZL1XYZ K ZL1XYZ DE ZLIAN — GE FRED — RST 579 579 — NAME HR GARY GARY ES QTH AUCKLAND AUCKLAND HW K?

ZL1XYZ DE ZLIAN K ZLIAN DE ZL1XYZ — R FB GARY — WX HR TODAY FINE ES TEMP 23 — RG HR TS440 RUNNING 100W — ANT IS DIPOLE AT 10 METRES — HW K?

ZLIAN DE ZL1XYZ K ZL1XYZ DE

ZLIAN R FB FRED — HR WX COLD BUT NO RAIN — RIG HR YAESU FT767GX — PWR 50W ES ANT END FED RANDOM WIRE WITH TUNER HI — BAND GUD TONITE — NO QRN OR QRM — HW K?

ZL1XYZ DE ZLIAN K ZLIAN DE ZL1XYZ R FB GARY — TNX FER QSO — NW CUL ES 73 GARY GN OM — ZLIAN DE ZL1XYZ SK dit dit dit

dit dit

Now at 12 wpm that exchange will have taken just over 10 minutes. That's plenty long enough for a start, so you can sign off gracefully. I guarantee you'll get a real buzz out of achieving that!

Points to note

- Overs start and finish with the call-sign exchange, terminate with "K". Some operators insert "AR" before the last one, and finish with "KN" — which means "I don't want anybody to break in". But most of us enjoy having others enter our conversations.
- We used the most common standard abbreviations: GE, ON, ES, TNX, R FER, HR, HW, FB, WX, RIG, ANT, HI, W, GUD, NW, CUL, GN. "HI" is usually sent as "HEE". (dididit dit dit) If these are new to you, look them up in this Call Book. They'll rapidly become intuitive, and really save time.
- We used the most common Q-code and procedural signs QTH, QRM, QRN, QSO, RST.
- We exchanged information in a very stylised manner. Between friends or ragchewers conversations will be less formal, especially after the first few overs, but you won't go wrong proceeding in just this way, and many DX conversations sound just like this.
- We each ended with a pleasant "dit dit" to say goodbye — not necessary, but you'll often hear it. (Sometimes after an interesting conversation several other "dit dits" will sound, from phantom listeners

who have been following the conversation.)

Almost everybody initially finds it difficult to "send from the head" instead of reading from a text as you will probably have been doing in practice. Therefore, write down the first few overs you'll send at least in skeleton form, so you can send from the hard copy. You'll rapidly find that this also becomes unnecessary. You'll also probably find it more natural to initially write down everything received, as you will have been doing while learning. With experience you'll begin to "read in the head" and note down only call-signs, times, signal reports, names and items to comment on. Experienced operators write up the log as they go, but at first it's much easier to scribble details down on a scratch pad and complete the log carefully afterwards.

If the conversation continues longer, what do you say? CW operators talk about almost everything. Make two more lists: one of short phrases about your job, your age, your family, your other hobbies, other modes you operate. You should ask questions also: what is your job? Do you operate PSK31/MFSK16/ATV? How long have you been a ham? This may seem contrived, but it will get you going. After a while these memory joggers won't be necessary either.

On the DX bands you will often hear stations calling "CQ". Eventually you'll want to send one yourself. The "3 × 3" format is best, that is: CQ CQ CQ DE ZLIAN ZLIAN ZLIAN repeated three times, terminated with "K". Don't be one of those irritating people who send "CQ CQ ..." 25 times before giving a call-sign. Listeners get impatient and wander off. Short calls, repeated after a few seconds are best. If you call CQ, tune around a few kHz listening for answers, as somebody may have forgetfully left his RIT engaged, and be replying outside your passband. When 40m and above are open, DX contacts are easy, since ZL stations are held to be quite rare and everybody is happy to talk to

us. Such contacts are often quite short. Often you'll hear: "MY QSL SURE PS QSL VIA BURO" which means "I will certainly send you my QSL card, please send yours via the QSL bureau". Information regarding QSL Bureau procedure will be found elsewhere in the Call Book, and somebody at the local Branch will explain what to do.

If you answer a CQ the accepted polite thing to do is to send back at a speed no greater than that of the sending station—unless you know that the other operator is capable of higher speeds. If somebody answers you at speeds higher than you can comfortably receive, send back "PSE QRS 12 WPM"—or whatever speed you can copy. If the other station won't do this, just sign off gracefully and talk to somebody else. There are plenty of DX stations who send around this speed, and many, CQing faster, will gladly slow down to talk to you.

You will also hear conversations at higher speeds in the 20 – 35 wpm range. These operators generally use electronic keyers and send very good Morse. Listen to such contacts frequently and you'll find your reading speed slowly improves. Once you have the experience to read in this range, you'll find contacts very enjoyable as a surprising amount of information can be passed at these speeds, and the Morse is better. You can easily build an electronic keyer yourself. Microprocessor-controlled chips are cheap, widely available from the web, and require few additional components. Google on "youtube homebrew keyer paddle" and you'll see some interesting paddle suggestions. Many have found that watching Morse decode on a computer screen while listening is very helpful for improving their reading ability. The simplest Windows program to get going is "CWget", written by Sergei, UA9OSV^[1]. Another is "CWdecoder", written by Grant, WD6CNF^[2]. Experienced operators say that the best is "MRP40", written by Norbert Pieper^[3].

These require only a cable connecting the audio from the receiver to the soundcard input, and are straightforward to set up. You'll hear stations conversing at 30–60 wpm sending with Morse keyboards, although the operators will almost certainly be reading in their heads. Once you can copy at these speeds, the Morse, being perfect, is a delight to copy—it just “decodes itself”. Conversations at these speeds are typically much more in “plain language” with few abbreviations and included punctuation.

Sergei provides a companion morse keyboard sending program, “CWtype”, while Grant’s reading program has a keyboard included. Both were designed to interface with the transmitter keying circuit via a simple interface connected to a printer or com port. But most modern computers have only USB ports, which are far more complicated to drive. Sergei recommends using one of several different commercial interfaces—see his website—which usually allow operation on several other modes as well. But this is

an added expense, and Dennis, KF3AD published an alternative interface in QST January 2007 which generates logical Morse from the soundcard audio. You can download his article from the web^[1]. Come down and join the regulars on the bottom end of 80 metres! We'll be glad to talk to you!

- ^[2] Download “CWdecoder” from <http://www.amqrp.org/projects/cwdecod/cwdecod.htm>
^[3] Download “MRP-40” from <http://www.polar-electric.com/Morse/MRP40-EN/index.htm>
^[4] See the sound-card to logic article at http://www.polar-electric.com/Morse/TX_via_Soundcard.pdf

References

- ^[1] Download “Cwget” from <http://www.dxsoft.com/en/downloads/>

ABBREVIATIONS FOR CW WORK

| | | | |
|----------|--|------------|---|
| ABT | About | OB | Old boy |
| AGN | Again | OC | Old chap |
| ANT | Antenna | OM | Old man |
| AR K | End of transmission | OP; OPR | Operator |
| AR VA | Final end of transmission | OT | Old timer; Old top |
| AS | Wait | | |
| BCI | Broadcast interference | PSE; | Please |
| BCL | Broadcast listener | PWR | Power |
| BK | Break; I wish to break-in (interrupt) a transmission in progress | R | Received as transmitted; are (sometimes also used as a decimal point, e.g. 1R5) |
| BN | All between; been | RCVR; RX | Receiver |
| BUG | Semi-automatic key | REF | Refer to; Referring to; Reference |
| B4 | Before | RFI | Radio frequency interference |
| C | Yes | RIG | Station equipment |
| CL | I am closing my station; call | RPRT, REPT | Report |
| CPI, CPY | Copy | RPT | Repeat; I repeat |
| CQ | Calling any station | RTT; RTTY | Radioteletype |
| CUAGN | See you again | RX; RCVR | Receiver |
| CUD | Could | SA | Say |
| CUL | See you later | SASE | Self-addressed, stamped envelope |
| CW | Continuous wave, i.e. radio telegraphy | SED | Said |
| DE | From | SIG | Signal |
| DR | Dear | SKED | Schedule |
| DX | Distance, foreign countries | SRI | Sorry |
| ER | Here | SSB | Single sideband |
| ES | And; & | SUM | Some |
| FB | Fine business, excellent | T | Zero (0) |
| FER | For | THO | Though |
| FM | Frequency modulation; From | THRU; THRO | Through |
| GA | Go ahead, continue sending; good afternoon | TMW | Tomorrow |
| GB | Goodbye | TNX; TKS | Thanks |
| GE | Good evening | TT | That |
| GG | Going; grounded grid | TU; TKU | Thank you |
| GM | Good morning | TVI | Television interference |
| GN | Good night | TX | Transmitter |
| GND | Ground | TXT | Text |
| GUD | Good | U | You |
| HI | Laughter; High | UR | Your; You are (sometimes YR) |
| HPE | Hope | URS | Yours (sometimes YRS) |
| HR | Here; Hear; Hour | VFO | Variable frequency oscillator |
| HV; HVE | Have | VY | Very |
| HW | How | WID | With |
| K | Go ahead | WKD; WKG | Worked; Working |
| KN | specific station go ahead | WL | Well; Will |
| MA; MILS | Milliamperes | WUD | Would |
| MNI | Many | WX | Weather |
| MSG | Message | XCVR | Transceiver |
| N | No; North | XMTR; TX | Transmitter |
| NCS | Net control station | XTAL | Crystal |
| ND | Nothing doing | XYL; YF | Wife |
| NIL | Nothing; I have nothing for you | YL | Young lady |
| NR | Number | 73 | Best Regards |
| NW | Now | 88 | Love and kisses |

THE Q-CODE

| | | | |
|-----|---|-----|--|
| QRG | Will you tell me my exact frequency (or that of ...)? Your exact frequency (or that of ...) is ... kHz. | QSB | Are my signals fading? Your signals are fading. |
| QRH | Does my frequency vary? Your frequency varies. | QSD | Are my signals mutilated? Your signals are mutilated. |
| QRI | How is the tone of my transmission? The tone of your transmission is ... (1. Good; 2. Variable; 3. Bad) | QSK | Can you hear me between your signals and if so can I break in on your transmission? I can hear you between my signals; break in on my transmission. |
| QRK | What is the intelligibility of my signals (or those of ...)? The intelligibility of your signals (or those of ...) is ... (1. Bad; 2. Poor; 3. Fair; 4. Good; 5. Excellent) | QSL | Can you acknowledge receipt? I am acknowledging receipt. |
| QRL | Are you busy? I am busy (or I am busy with ...) Please do not interfere. | QSM | Shall I repeat the last message I sent you, or some previous message? Repeat the last message which you sent me [or message(s) number(s) ...] |
| QRM | Is my transmission being interfered with? Your transmission is being interfered with ... (1. Nil; 2. Slightly; 3. Moderately; 4. Severely; 5. Extremely) | QSN | Did you hear me (or ...) on ... kHz? I did hear you (or ...) on ... kHz. |
| QRN | Are you troubled by static? I am troubled by static ... (1-5 as under QRM) | QSO | Can you communicate with ... direct or by relay? I can communicate with ... direct (or by relay through ...) |
| QRO | Shall I increase power? Increase power. | QSP | Will you relay to ...? I will relay to ... |
| QRP | Shall I decrease power? Decrease power. | QST | General call preceding a message addressed to all amateurs and ARRL members. |
| QRQ | Shall I send faster? Send faster (... wpm). | QSU | Shall I send or reply on this frequency (or ... kHz)? Send or reply on this frequency (or ... kHz). |
| QRS | Shall I send more slowly? Send more slowly (... wpm) | QSV | Shall I send a series of Vs on this frequency (or on ... kHz)? Send a series of Vs on this frequency (or on ... kHz) |
| QRT | Shall I stop sending? Stop sending. | QSW | Will you send on this frequency (or on ... kHz)? I am going to send on this frequency (or on ... kHz) |
| QRU | Have you anything for me? I have nothing for you. | QSX | Will you listen to ... on ... kHz? I am listening to ... on ... kHz. |
| QRV | Are you ready? I am ready. | QSY | Shall I change to transmission on another frequency? Change to transmission on another frequency (or on ... kHz). |
| QRW | Shall I inform ... that you are calling him on ... kHz? Please inform ... that I am calling on ... kHz. | QSZ | Shall I send each word or group more than once? Send each word or group twice (or ... times). |
| QRX | When will you call me again? I will call you again at ... hours (on ... kHz). | QTC | How many messages have you to send? I have ... messages for you (or for ...) |
| QRZ | Who is calling me? You are being called by ... (on ... kHz) | QTH | What is your location? My location is ... (QTHR—Location as per Call Book) |
| QSA | What is the strength of my signals (or those of ...)? The strength of your signals (or those of ...) is ... (1. Scarcely perceptible; 2. Weak; 3. Fairly good; 4. Good; 5. Very good) | QTR | What is the correct time? The time is ... |

Morse Alphabet

| | | | |
|---|---------|---|---------|
| A | • — | N | — • |
| B | — • • • | O | — — — |
| C | — • — • | P | • — — • |
| D | — • • | Q | — — • — |
| E | • | R | • • • |
| F | • • — • | S | • • • |
| G | — — • | T | — |
| H | • • • • | U | • • — |
| I | • • | V | • • • — |
| J | • — — — | W | • — — |
| K | — • — | X | — • • — |
| L | • — • • | Y | — • — — |
| M | — — | Z | — — • • |

Numerals

| | | | |
|---|-----------|---|-----------|
| 1 | • — — — — | 6 | — • • • • |
| 2 | • • — — — | 7 | — — • • • |
| 3 | • • • — — | 8 | — — — • • |
| 4 | • • • • — | 9 | — — — — • |
| 5 | • • • • • | 0 | — — — — — |

Procedure Signals

| | |
|--------------------------|-----------------|
| Full stop | (.) • — • — • — |
| Comma | (,) — — • • — — |
| Colon | (:) — — — • • • |
| Question mark/Repeat | (?) • • — — • • |
| Apostrophe | (') • — — — — • |
| Hyphen/dash | (-) — • • • • — |
| Fraction bar | (/) — • • — • |
| Parenthesis (left hand) | (() — • — — • |
| Parenthesis (right hand) | ()) — • — — • |
| Quotation marks | (“) • — • • — • |
| Error | • • • • • • • |

Spacing and length of signal

1. A dash is equal to three dots.
2. The space between the signals which form the same letter is equal to one dot.
3. The space between two letters is equal to three dots.
4. The space between two words is equal to seven dots.

WORLD TIME CONVERSION CHART IN HOURS

| | | | | | | | | | | | | | | | | | | | | | | | | |
|--|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Azores, Cape Verde | 11pm | Mid Night | 1am | 2am | 3am | 4am | 5am | 6am | 7am | 8am | 9am | 10am | 11am | Noon | 1pm | 2pm | 3pm | 4pm | 5pm | 6pm | 7pm | 8pm | 9pm | 10pm |
| Fernando de Horonha | 10pm | 11pm | Mid Night | 1am | 2am | 3am | 4am | 5am | 6am | 7am | 8am | 9am | 10am | 11am | Noon | 1pm | 2pm | 3pm | 4pm | 5pm | 6pm | 7pm | 8pm | 9pm |
| Greenland, Rio de Janiero, Brazil | 9pm | 10pm | 11pm | Mid Night | 1am | 2am | 3am | 4am | 5am | 6am | 7am | 8am | 9am | 10am | 11am | Noon | 1pm | 2pm | 3pm | 4pm | 5pm | 6pm | 7pm | 8pm |
| Atlantic Standard Time, Chile, Nova Scotia | 8pm | 9pm | 10pm | 11pm | Mid Night | 1am | 2am | 3am | 4am | 5am | 6am | 7am | 8am | 9am | 10am | 11am | Noon | 1pm | 2pm | 3pm | 4pm | 5pm | 6pm | 7pm |
| Eastern Standard Time, Montreal, New York, Peru | 7pm | 8pm | 9pm | 10pm | 11pm | Mid Night | 1am | 2am | 3am | 4am | 5am | 6am | 7am | 8am | 9am | 10am | 11am | Noon | 1pm | 2pm | 3pm | 4pm | 5pm | 6pm |
| Central Standard Time, Chicago, Costa Rica | 6pm | 7pm | 8pm | 9pm | 10pm | 11pm | Mid Night | 1am | 2am | 3am | 4am | 5am | 6am | 7am | 8am | 9am | 10am | 11am | Noon | 1pm | 2pm | 3pm | 4pm | 5pm |
| Mountain Standard Time, Calgary, Denver, Phoenix | 5pm | 6pm | 7pm | 8pm | 9pm | 10pm | 11pm | Mid Night | 1am | 2am | 3am | 4am | 5am | 6am | 7am | 8am | 9am | 10am | 11am | Noon | 1pm | 2pm | 3pm | 4pm |
| Pacific Standard Time, Los Angeles, Seattle, Juneau | 4pm | 5pm | 6pm | 7pm | 8pm | 9pm | 10pm | 11pm | Mid Night | 1am | 2am | 3am | 4am | 5am | 6am | 7am | 8am | 9am | 10am | 11am | Noon | 1pm | 2pm | 3pm |
| Eastern Alaska, Dawson | 3pm | 4pm | 5pm | 6pm | 7pm | 8pm | 9pm | 10pm | 11pm | Mid Night | 1am | 2am | 3am | 4am | 5am | 6am | 7am | 8am | 9am | 10am | 11am | Noon | 1pm | 2pm |
| Hawaiian Islands | 2pm | 3pm | 4pm | 5pm | 6pm | 7pm | 8pm | 9pm | 10pm | 11pm | Mid Night | 1am | 2am | 3am | 4am | 5am | 6am | 7am | 8am | 9am | 10am | 11am | Noon | 1pm |
| Nome, Alaska, Samoa, Midway Islands | 1pm | 2pm | 3pm | 4pm | 5pm | 6pm | 7pm | 8pm | 9pm | 10pm | 11pm | Mid Night | 1am | 2am | 3am | 4am | 5am | 6am | 7am | 8am | 9am | 10am | 11am | Noon |
| International Date Line, Fiji Islands, New Zealand Standard Time | Noon | 1pm | 2pm | 3pm | 4pm | 5pm | 6pm | 7pm | 8pm | 9pm | 10pm | 11pm | Mid Night | 1am | 2am | 3am | 4am | 5am | 6am | 7am | 8am | 9am | 10am | 11am |
| New Caledonia | 11am | Noon | 1pm | 2pm | 3pm | 4pm | 5pm | 6pm | 7pm | 8pm | 9pm | 10pm | 11pm | Mid Night | 1am | 2am | 3am | 4am | 5am | 6am | 7am | 8am | 9am | 10am |
| Eastern Australia, Melbourne, Sydney | 10am | 11am | Noon | 1pm | 2pm | 3pm | 4pm | 5pm | 6pm | 7pm | 8pm | 9pm | 10pm | 11pm | Mid Night | 1am | 2am | 3am | 4am | 5am | 6am | 7am | 8am | 9am |
| Central Australia, Tokyo Japan | 9am | 10am | 11am | Noon | 1pm | 2pm | 3pm | 4pm | 5pm | 6pm | 7pm | 8pm | 9pm | 10pm | 11pm | Mid Night | 1am | 2am | 3am | 4am | 5am | 6am | 7am | 8am |
| Philippine Islands Perth Australia | 8am | 9am | 10am | 11am | Noon | 1pm | 2pm | 3pm | 4pm | 5pm | 6pm | 7pm | 8pm | 9pm | 10pm | 11pm | Mid Night | 1am | 2am | 3am | 4am | 5am | 6am | 7am |
| Laos, Sumatra, Thailand | 7am | 8am | 9am | 10am | 11am | Noon | 1pm | 2pm | 3pm | 4pm | 5pm | 6pm | 7pm | 8pm | 9pm | 10pm | 11pm | Mid Night | 1am | 2am | 3am | 4am | 5am | 6am |
| Calcutta, Novosibirsk Russia, Bangladesh | 6am | 7am | 8am | 9am | 10am | 11am | Noon | 1pm | 2pm | 3pm | 4pm | 5pm | 6pm | 7pm | 8pm | 9pm | 10pm | 11pm | Mid Night | 1am | 2am | 3am | 4am | 5am |
| Central Russia, Pakistan | 5am | 6am | 7am | 8am | 9am | 10am | 11am | Noon | 1pm | 2pm | 3pm | 4pm | 5pm | 6pm | 7pm | 8pm | 9pm | 10pm | 11pm | Mid Night | 1am | 2am | 3am | 4am |
| Mauritius, Oman, Reunion Island | 4am | 5am | 6am | 7am | 8am | 9am | 10am | 11am | Noon | 1pm | 2pm | 3pm | 4pm | 5pm | 6pm | 7pm | 8pm | 9pm | 10pm | 11pm | Mid Night | 1am | 2am | 3am |
| Arabia, Iraq, Eastern Europe, Moscow, Ethiopia, Malagasy | 3am | 4am | 5am | 6am | 7am | 8am | 9am | 10am | 11am | Noon | 1pm | 2pm | 3pm | 4pm | 5pm | 6pm | 7pm | 8pm | 9pm | 10pm | 11pm | Mid Night | 1am | 2am |
| Athens, Cape Town, Cairo | 2am | 3am | 4am | 5am | 6am | 7am | 8am | 9am | 10am | 11am | Noon | 1pm | 2pm | 3pm | 4pm | 5pm | 6pm | 7pm | 8pm | 9pm | 10pm | 11pm | Mid Night | 1am |
| Central Europe, Berlin, Geneva, Stockholm, Vienna | 1am | 2am | 3am | 4am | 5am | 6am | 7am | 8am | 9am | 10am | 11am | Noon | 1pm | 2pm | 3pm | 4pm | 5pm | 6pm | 7pm | 8pm | 9pm | 10pm | 11pm | Mid Night |
| Greenwich Meridian Time, London, England | 0000 | 0100 | 0200 | 0300 | 0400 | 0500 | 0600 | 0700 | 0800 | 0900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 |

OPERATING INFORMATION

NEW ZEALAND AMATEUR RADIO BANDPLANS P1 OF 2

These charts show the New Zealand bandplans. **These bandplans are to ensure that your transmissions do not impose problems on other operators and that their transmissions do not impact on you. It is to the advantage of all operators that the published bandplans be used.** The Ministry of Economic Development (MED) defines the band limits, while the internal band segments are derived from the IARU Region 3 bandplans with New Zealand adaptations. The band limits are found in Radiocommunications Regulations (General User Radio Licence for Amateur Radio Operators) on the NZART web site in the Study Guide (Regulations) <http://www.nzart.org.nz/exam/index.html> and at each end of the band blocks as shown below.

The IARU Region 3 bandplans, developed to meet international requirements, are at the IARU Region 3 web site. <http://www.iaru-r3.net/r3bandplan.doc>

0.130 to 0.190 MHz – 1800 metres

Radiated power must not exceed 5 W e.i.r.p.

0.130 AN 0.190

0.505 to 0.515 MHz – 600 metres

<http://www.nzart.org.nz/policies/2010-access-to-600m.html>

Temporary allocation from 1-March-2010.

Radiated power must not exceed 25 W e.i.r.p.

0.505 Bandwidth < 200 Hz 0.515

1.800 to 1.950 MHz – 160 metres

1.800 C AN 1.950

3.500 to 3.900 MHz – 80 metres

3.500 C AN DN AN 3.900

7.000 to 7.300 MHz – 40 metres

Amateur satellite service permitted 7.0 - 7.1 MHz.

7.2 to 7.3 MHz access is secondary to other users

7.000 C DN AN 7.300

10.100 to 10.150 MHz – 30 metres

10.100 C DN 10.150

KEYS:- also apply to the second page

- C = CW or modes less than 1 kHz bandwidth
- A = All modes with bandwidth less than 16 kHz
- AN = All modes with bandwidth less than 6 kHz
- AW = All modes
- D = Data modes with bandwidth less than 16 kHz
- DN = Data modes with bandwidth less than 6 kHz
- 1 = Standard 1 MHz narrow band segment
- ▨ = ATV repeater outputs only – 50 cm
- ▨ = Telemetry or telecontrol only – 11 metres
- ▲ = Repeater input band segment
- ▼ = Repeater output band segment

ATV = Amateur TeleVision, B = Beacons,
FM = FM simplex, S = Satellites, L = Link

- NOTES:** 1. The frequencies at each end of the band blocks are the band limit frequencies;
2. The frequency, giving a point in a band, can be aligned in the centre or at the first or last digit;

Notes continue at bottom of second page

14.000 to 14.350 MHz – 20 metres

Amateur satellite service permitted 14.00-14.25 MHz

14.000 C DN AN 14.350

18.068 to 18.168 MHz – 17 metres

Amateur satellite service permitted in whole band

18.068 C DN AN 18.168

21.000 to 21.450 MHz – 15 metres

Amateur satellite service permitted in whole band

21.000 C DN AN 21.450

24.890 to 24.990 MHz – 12 metres

Amateur satellite service permitted in whole band

24.890 C DN AN 24.990

26.950 to 27.300 MHz – 11 metres

Telemetry or telecontrol only, 5 W e.i.r.p. maximum.

Also designated for Industrial, Scientific and Medical purposes

26.950 ▨ 27.300

28.000 to 29.700 MHz – 10 metres

Amateur satellite service permitted in whole band

28.000 C DN A 29.700

51.000 to 53.000 MHz – 6 metres

SSB/CW calling 52.05 MHz, FM calling 52.525 MHz. 53.6-54 MHz available for MED approved fixed transmitters. See URL : <http://www.nzart.org.nz/exam/sg/sn01-regul.html#r11A>

Note: Operation between 50 and 51 MHz requires the possession of a MED 6 metre contract.

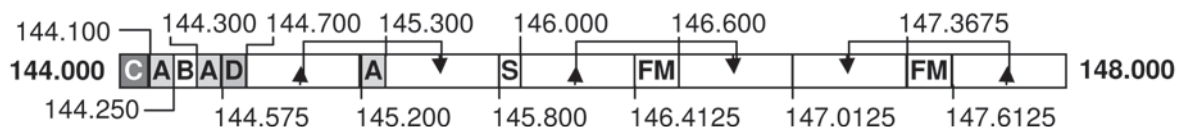
50.000 See note A 53.000 ▲ ▼ 54.000

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NEW ZEALAND AMATEUR RADIO BANDPLANS P2 OF 2

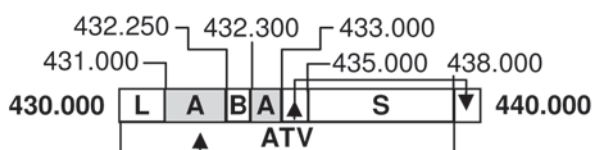
144.000 to 148.000 MHz – 2 metres

Amateur satellite service permitted in the range 144-146 MHz. Oceania SSB calling 144.1 MHz, ZL calling 144.2 MHz, FM calling 144.5 and 146.475 MHz. Primary packet/digipeater 144.65 MHz, other frequencies available. Below 147 MHz, repeater offset -600 kHz, otherwise +600 kHz; Beacons 144.250-144.300 MHz



430.000 to 440.000 MHz – 70 cm

Amateur satellite permitted in the range 435-438 MHz. SSB calling 432.2 MHz, FM calling 432.5 MHz, Beacons 432.25-432.30 MHz. Primary packet/digipeater 432.65 MHz, other frequencies available. Repeater offsets -5 MHz in most cases, +5 MHz otherwise. In general, the ATV repeaters have an input frequency of 431.250 MHz vision, 436.750 MHz FM sound and 437.100 MHz NICAM sound



614.000 to 622.000 MHz – 50 cm TV CH 39

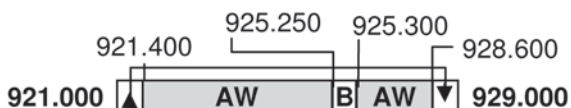
ATV vision carrier 615.25 MHz ITU(R) system G



921.000 to 929.000 MHz – 32 cm

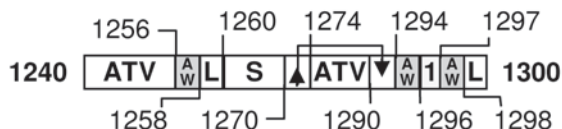
Power 25 W e.i.r.p., SSB calling 925.2 MHz, FM calling 925.5 MHz. Beacons 925.25-925.30 MHz

Also designated for Industrial, Scientific and Medical



1240 to 1300 MHz – 23 cm

SSB calling 1296.2 MHz, FM calling 1296.5 MHz. Beacons 1296.25-1296.30 MHz. ATV video carriers 1241.25, 1249.25, 1275.25 and 1283.25 MHz ITU(R) system G. Repeaters -20 MHz offset. Amateur satellite service in band 1260- 1270 MHz, uplink only

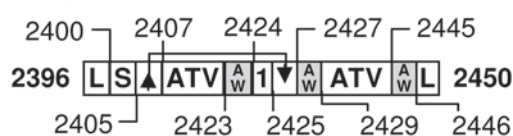


To find the narrow band segment bandplan for the microwave bands, please look for *Simplex and Calling Frequencies* that can be found elsewhere in this Call Book

For KEY to codes see page 1

2396 to 2450 MHz – 12 cm

Standard 1 MHz narrow band segment 2424-2425 MHz. SSB calling 2424.2 MHz, FM calling 2424.5 MHz. Beacons 2424.25-2424.30 MHz. ATV in segments 2407-2423 and 2429-2445 MHz, Repeaters - 20 MHz offset. Amateur satellite service in 2400-2450 MHz. 2400-2450 MHz is also designated for Industrial, Scientific and Medical (ISM) purposes

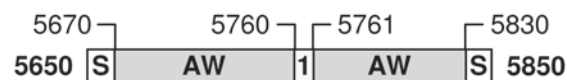


3300 to 3410 MHz – 9 cm

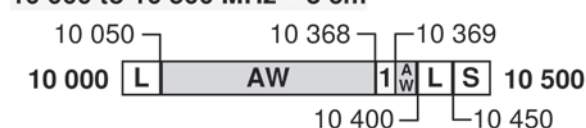


5650 to 5850 MHz – 5 cm

Satellites 5650-5670 MHz earth-to-space only; 5830-5850 MHz space-to-earth only



10 000 to 10 500 MHz – 3 cm



24 000 to 24 250 MHz – 1.2 cm



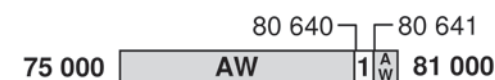
47 000 to 47 200 MHz – 6 mm

Amateur satellite available on the entire band



75 500 to 81 000 MHz – 4 mm

Amateur satellite available on the entire band



NOTES continued:

3. Prepared for the FMTAG by Jamie Pye ZL2NN July 2010.
4. Corrections, updates and suggestions to: zl2nn@nzart.org.nz;
5. Download or view from <http://www.nzart.org.nz/maps/2010/bp1-2.pdf>

All frequencies shown in MHz

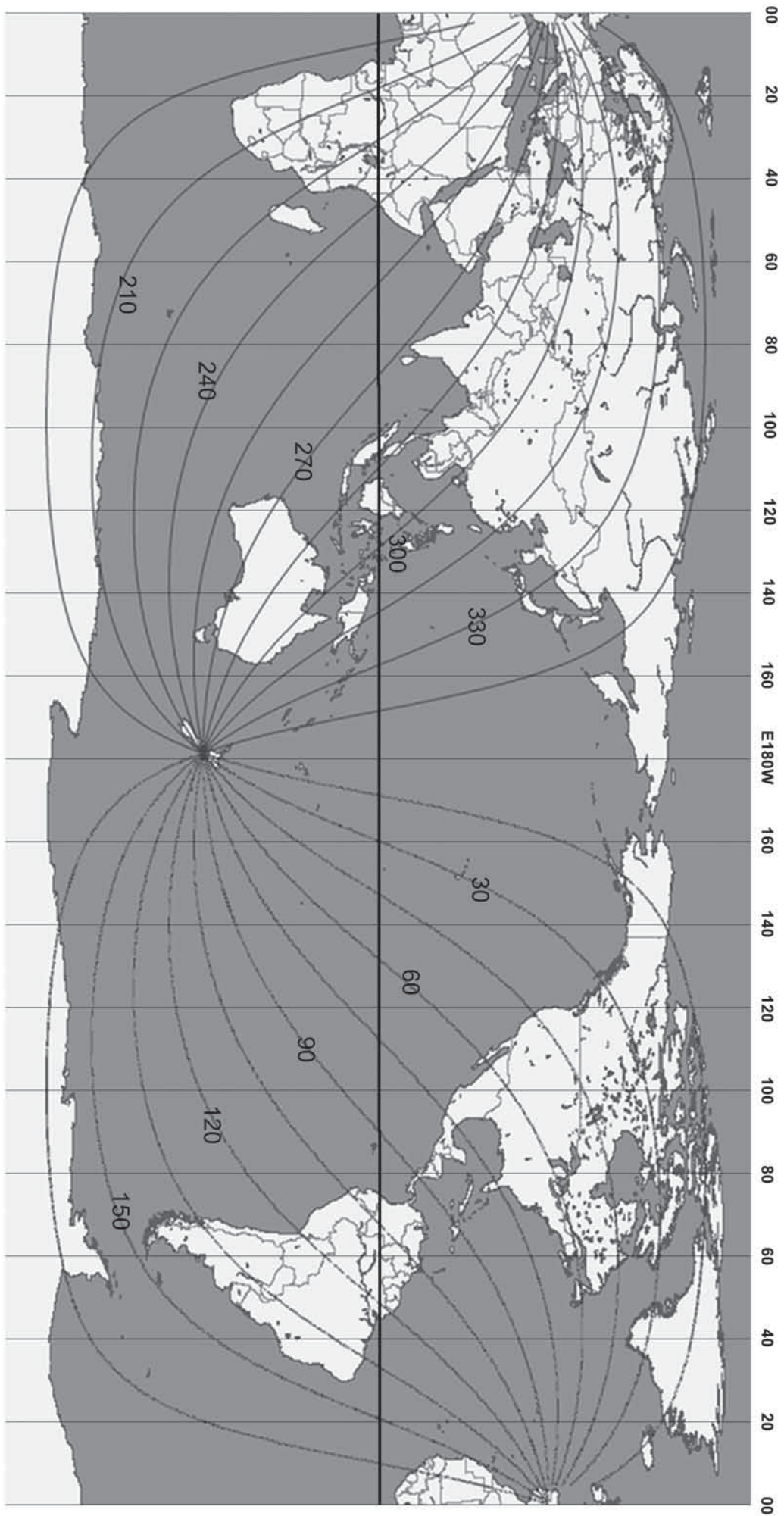
Great Circle DX Bearings Based on Wellington

Listed below are the approximate short path bearings based on the great circle map centred on Wellington. These listings, based on true north, will allow you to aim your directional antenna in the appropriate direction before final adjustment depending on reception. The long path bearings are about 180 degrees in the opposite direction. There are several programmes which allow you to plot and save great circle maps either in polar or rectangular format and centred on any location. These include "Pizza" (www.TonneSoftware.com), "GcmWin" (www.qsl.net/sm3gsj) and an online version at www.gcmmap.com in rectangular format.

| Prefix | Entity | Azimuth | Lat (- S) | Long (- E) | Dist (km) |
|--------|----------------------|---------|--------------|---------------|-----------|
| 1A | Knights of Malta | 280 | 41.9 | 12.4 | 18598 |
| 1S | Spratly Island | 295 | 8.8 | 111.9 | 8509 |
| 3A | Monaco | 292 | 44 | 7.5 | 18972 |
| 3B6 | Agalega - St Brandon | 243 | 10.4 | 56.6 | 11542 |
| 3B8 | Mauritius | 237 | 20.3 | 57.5 | 10664 |
| 3B9 | Rodriguez Island | 241 | 19.8 | 63.4 | 10281 |
| 3C | Equatorial Guinea | 203 | 1.8 | 10 | 15418 |
| 3C0 | Pagalu Island | 196 | 1.5 | 5.6 | 15508 |
| 3D2 | Fiji Island | 6 | 17 | 178 | 2686 |
| 3D2C | Conway Reef | 358 | 21.4 | 174.4 | 2185 |
| 3D2X | Rotuma | 5 | 12.3 | 177.7 | 3205 |
| 3DA | Swaziland | 213 | 27 | 31.5 | 11586 |
| 3V | Tunisia | 255 | 36.8 | 10.2 | 18654 |
| 3W | Vietnam | 292 | 10.8 | 106.7 | 9068 |
| 3X | Republic of Guinea | 164 | 10 | -13 | 16480 |
| 3Y/B | Bouvet Island | 185 | 54.5 | 3 | 9373 |
| 3Y/P | Peter I Island | 153 | 68.5 | -90.5 | 5987 |
| 4J | Azerbaijan | 288 | 40.5 | 50 | 15493 |
| 4J1 | Mal'j Vysotskij Is. | 325 | 60.4 | 28.4 | 16910 |
| 4K2 | Franz Josef Land | 348 | 80 | 50 | 15157 |
| 4L | Georgia | 288 | 41.5 | 45 | 15927 |
| 4S | Sri Lanka | 272 | 7 | 79.9 | 10974 |
| 4U1I | ITU Geneva | 307 | 46.2 | 6.2 | 18977 |
| 4U1U | United Nations HQ/NY | 66 | 40.8 | -74 | 14367 |
| 4W6 | East Timor | 292 | 8.5 | 125.6 | 6070 |
| 4X | Israel | 267 | 32 | 35 | 16369 |
| 5A | Libya | 244 | 32.5 | 12.5 | 18227 |
| 5B | Cyprus | 271 | 35 | 33 | 16679 |
| 5H | Tanzania | 231 | 7 | 39.5 | 13035 |
| 5N | Nigeria | 193 | 6.5 | 3 | 16109 |
| 5R | Madagascar | 230 | 18.5 | 47 | 11524 |
| 5T | Mauritania | 154 | 18 | -16 | 17248 |
| 5U | Niger | 194 | 13.5 | 2 | 16895 |
| 5V | Togo | 191 | 6 | 1.5 | 16081 |
| 5W | Western Samoa | 25 | 13 | -172 | 3355 |
| 5X | Uganda | 230 | 1 | 32.5 | 14212 |
| 5Z | Kenya | 233 | 1.5 | 37.5 | 13659 |
| 6W | Senegal | 152 | 15 | -18 | 16860 |
| 6Y | Jamaica | 87 | 18 | -76.8 | 12803 |
| 7O | Yemen | 252 | 13 | 45 | 14299 |
| 7P | Lesotho | 209 | 29.5 | 28 | 11487 |
| 7Q | Malawi | 222 | 15 | 35 | 12571 |
| 7X | Algeria | 237 | 36.7 | 3 | 19203 |
| 8P | Barbados | 105 | 11.5 | -59.5 | 13782 |
| 8Q | Maldiv Islands | 266 | 4.4 | 73.4 | 11330 |
| 8R | Guyana | 111 | 6.8 | -58.2 | 13526 |
| 9A | Croatia | 294 | 45.5 | 15.6 | 18312 |
| 9G | Ghana | 188 | 5.5 | -0.2 | 16048 |
| 9H | Malta | 258 | 36 | 14.4 | 18275 |
| 9J | Zambia | 216 | 15 | 28 | 12940 |
| 9K | Kuwait | 271 | 29 | 48 | 15117 |
| 9L | Sierra Leone | 165 | 8.5 | -13.2 | 16312 |
| 9M2 | West Malaysia | 283 | 3 | 102 | 8843 |
| 9M6 | East Malaysia | 296 | 5 | 117 | 7815 |
| 9N | Nepal | 291 | 27.5 | 85 | 11998 |
| 9Q | Zaire | 207 | 4.3 | 15.3 | 14588 |
| 9U | Burundi | 223 | 3 | 29 | 14053 |
| 9V | Singapore | 283 | 1.3 | 103.8 | 8568 |
| 9X | Rwanda | 226 | 1.5 | 30 | 14136 |
| 9Y | Trinidad - Tobago Is | 104 | 11 | -62.5 | 13501 |
| A2 | Botswana | 210 | 22 | 25 | 12371 |
| A3 | Republic of Tonga | 25 | 21 | -175 | 2410 |
| A4 | Oman | 272 | 23.5 | 59 | 13864 |
| A5 | Bhutan | 295 | 28 | 90 | 11646 |
| A6 | United Arab Emirates | 272 | 25.3 | 55.3 | 14287 |
| A7 | Qatar | 269 | 25.3 | 51.5 | 14606 |
| A9 | Bahrain | 270 | 26 | 50.5 | 14732 |
| AP | Pakistan | 279 | 25 | 67 | 13291 |
| BS7 | Scarborough Reef | 303 | 15.1 | 117.5 | 8616 |
| BV | Taiwan | 313 | 25 | 122 | 9173 |
| BV9 | Pratas Island | 306 | 20.7 | 116.7 | 9144 |
| BY | China | 319 | 40 | 116.4 | 10801 |
| C2 | Nauru | 347 | 0.5 | 166.9 | 4587 |
| C3 | Andorra | 290 | 42.5 | 1.5 | 19485 |
| C5 | The Gambia | 156 | 13 | -17 | 16688 |
| C6 | Bahamas | 81 | 25 | -77.5 | 13205 |
| C9 | Mozambique | 215 | 26 | 33 | 11614 |
| CE | Chile | 130 | 33.5 | -70.8 | 9329 |
| CE0A | Easter Island | 104 | 28 | -109 | 6877 |
| CE0X | San Felix | 119 | 26 | -80 | 9276 |
| CE0Z | Juan Fernandez | 125 | 33.6 | -78.8 | 8789 |
| CE9 | Antarctica | 167 | 80 | -120 | 5049 |
| CN | Morocco | 161 | 33 | -8 | 19088 |
| CO | Cuba | 79 | 23.1 | -82.4 | 12677 |
| CP | Bolivia | 120 | 16.5 | -68.4 | 10873 |
| CT | Portugal | 123 | 38.7 | -9.2 | 19566 |
| CT3 | Madeira Island | 125 | 33 | -17 | 18620 |
| CU | Azores Islands | 94 | 38 | -25 | 18259 |
| CX | Uruguay | 140 | 34.9 | -56.2 | 10076 |
| CY0 | Sable Island | 67 | 43.8 | -60 | 15562 |
| CY9 | St. Paul Island | 62 | 47.2 | -60.1 | 15645 |
| D2 | Angola | 203 | 8.8 | 13.2 | 14186 |
| D4 | Rep. of Cape Verde | 141 | 16 | -24 | 16682 |
| D6 | Comoros | 232 | 11.8 | 43.7 | 12332 |
| DL | Fed. Rep. of Germany | 327 | 51 | 6 | 18645 |
| DU | Philippines | 306 | 14.6 | 121 | 8331 |
| E3 | Eritrea | 243 | 9 | 38.7 | 14472 |
| E4 | Palestine | 267 | 32 | 35 | 16369 |
| EA | Spain | 231 | 40.4 | -3.7 | 19916 |
| EA6 | Balearic Islands | 258 | 39.5 | 3 | 19349 |
| EA8 | Canary Islands | 144 | 28 | -15 | 18301 |
| EA9 | Ceuta - Melilla | 175 | 35.9 | -5.3 | 19454 |
| EI | Ireland | 4 | 53.3 | -6.3 | 18657 |
| EK | Armenia | 286 | 40.5 | 44.5 | 15935 |
| EL | Liberia | 169 | 7 | -11 | 16190 |
| EP | Iran | 282 | 35.8 | 51.8 | 15151 |
| ER | Moldova | 295 | 47 | 28.8 | 17286 |
| ES | Estonia | 325 | 59.4 | 24.8 | 17140 |
| ET | Ethiopia | 243 | 9 | 38.7 | 14472 |
| EU | Belarus | 312 | 54 | 27.5 | 17243 |
| EX | Kyrgyzstan | 301 | 42.9 | 74.6 | 13720 |
| EY | Tajikistan | 294 | 39.5 | 67 | 14116 |
| EZ | Turkmenistan | 288 | 38 | 58 | 14750 |
| F | France | 330 | 48.8 | 2.3 | 19001 |
| FG | Guadeloupe | 100 | 16 | -61.7 | 13928 |
| FH | Mayotte | 232 | 13 | 45.3 | 12120 |
| FJ | St Martin Island | 97 | 18 | -63 | 13959 |
| FK | New Caledonia | 336 | 22.3 | 166.5 | 2240 |
| FK/C | Chesterfield Islands | 321 | 19.9 | 158.3 | 2847 |
| FM | Martinique | 101 | 14.6 | -61 | 13886 |
| FO | French Polynesia | 62 | 17.6 | -150 | 4213 |
| FO/A | Austral Islands | 70 | 24 | -150 | 3733 |
| FO/C | Clipperton Island | 73 | 10.3 | -109.2 | 9579 |
| FO/M | Marquesas Islands | 64 | 9 | -139.5 | 5690 |
| FP | St Pierre - Miquelon | 63 | 46.7 | -56 | 15940 |
| FR | Reunion Island | 235 | 21 | 55.5 | 10744 |
| FR/G | Glorioso Island | 235 | 10.6 | 47.3 | 12194 |
| FR/J | Juan de Nova | 223 | 21.5 | 40 | 11677 |
| FR/T | Tromelin Island | 238 | 15.5 | 54.5 | 11274 |
| FTSW | Crozet Island | 216 | 46 | 52 | 8829 |
| FT8X | Kerguelen Island | 222 | 50 | 70 | 7562 |
| FT8Z | Amsterdam - St Paul | 236 | 37 | 77.6 | 7973 |
| FW | Wallis - Futuna Is. | 18 | 14 | -176 | 3124 |
| FY | French Guiana | 117 | 5 | -52 | 13858 |
| G | England | 345 | 51.5 | -0.1 | 18810 |
| GD | Isle of Man | 359 | 54 | -4.5 | 18584 |
| GI | Northern Ireland | 3 | 54.6 | -5.9 | 18515 |
| GJ | Jersey | 349 | 49.3 | -2.2 | 19086 |
| GM | Scotland | 357 | 56 | -3.2 | 18358 |
| GU | Guernsey | 351 | 49.5 | -2.7 | 19072 |
| GW | Wales | 355 | 51.5 | -3.2 | 18856 |
| H4 | Solomon Islands | 333 | 9.4 | 160 | 3826 |
| H40 | Temotu | 342 | 10.4 | 165.5 | 3540 |
| HA | Hungary | 299 | 47.5 | 19.1 | 18006 |
| HB | Switzerland | 308 | 47 | 7.5 | 18847 |
| HB0 | Liechtenstein | 306 | 47.2 | 9.6 | 18695 |
| HC | Ecuador | 101 | 0.2 | -78 | 11394 |
| HC8 | Galapagos Islands | 93 | 0.5 | -90.5 | 10332 |
| HH | Haiti | 90 | 18.5 | -72.2 | 13223 |
| HI | Dominican Republic | 91 | 18.5 | -70 | 13407 |
| HK | Colombia | 100 | 4.6 | -74.1 | 12074 |
| HK0M | Malpelo Island | 96 | 4 | -81.1 | 11448 |
| HK0S | San Andres Island | 89 | 12.5 | -81.7 | 12010 |
| HL | South Korea | 324 | 37.5 | 127 | 10021 |
| HP | Panama | 93 | 9 | -79.5 | 11945 |
| HR | Honduras | 84 | 14 | -87.2 | 11655 |
| HS | Thailand | 290 | 13.8 | 100.5 | 9785 |
| HV | Vatican City | 280 | 41.9 | 12.5 | 18590 |

| | | | | | |
|-------|----------------------|-----|------|--------|-------|
| HZ | Saudi Arabia | 270 | 26.3 | 50 | 14792 |
| I | Italy | 280 | 41.9 | 12.5 | 18590 |
| IS | Sardinia | 265 | 39.2 | 9.1 | 18834 |
| J2 | Djibouti | 249 | 11.6 | 43.2 | 14335 |
| J3 | Grenada | 103 | 12 | -61.8 | 13632 |
| J5 | Guinea-Bissau | 159 | 11.9 | -15.6 | 16617 |
| J6 | St. Lucia | 102 | 13.9 | -61 | 13836 |
| J7 | Dominica | 100 | 15.4 | -61.3 | 13919 |
| J8 | St. Vincent | 102 | 13.3 | -61.3 | 13768 |
| JA | Japan | 332 | 35.7 | 139.8 | 9273 |
| JD/M | Minami Torishima | 339 | 24.3 | 154 | 7593 |
| JD/O | Ogasawara | 329 | 27.5 | 141 | 8403 |
| JT | Mongolia | 319 | 47.9 | 106.9 | 11960 |
| JW | Svalbard | 354 | 78.8 | 16 | 15727 |
| JX | Jan Mayen | 2 | 71 | -8.3 | 16686 |
| JY | Jordan | 268 | 32 | 35.9 | 16294 |
| K | United States | 58 | 37.7 | -98.7 | 12362 |
| KC6 | Belau West Carolines | 317 | 9.5 | 138.2 | 6783 |
| KG4 | Guantanamo Bay | 87 | 19.9 | -75 | 13081 |
| KH0 | Mariana Is. Saipan | 331 | 15.2 | 148.8 | 6825 |
| KH1 | Baker - Howland Is. | 13 | 0.5 | -176 | 4704 |
| KH2 | Guam Island | 326 | 13.5 | 144.8 | 6829 |
| KH3 | Johnston Island | 18 | 17 | -168.5 | 6670 |
| KH4 | Midway Island | 7 | 28.2 | -177.4 | 7739 |
| KH5 | Palmyra Island | 29 | 5.9 | -162.1 | 5708 |
| KH5K | Kingman Reef | 28 | 7.5 | -162.8 | 5846 |
| KH6 | Hawaii | 27 | 21.3 | -157.9 | 7468 |
| KH7 | Kure Island | 6 | 28.4 | -178.4 | 7752 |
| KH8 | American Samoa | 28 | 14.3 | -170.8 | 3265 |
| KH8/S | Swains Island | 26 | 11.1 | -171.1 | 3587 |
| KH9 | Wake Island | 351 | 19.3 | 166.6 | 6772 |
| KL7 | Alaska | 17 | 61.2 | -150 | 11800 |
| KP1 | Navassa Island | 88 | 18.4 | -75 | 12981 |
| KP2 | US Virgin Islands | 95 | 18.3 | -64.9 | 13821 |
| KP4 | Puerto Rico | 94 | 18.5 | -66.2 | 13726 |
| KP5 | Desecheo Island | 93 | 18.3 | -67.5 | 13603 |
| LA | Norway | 338 | 60 | 10.7 | 17664 |
| LU | Argentina | 138 | 34.6 | -58.4 | 9982 |
| LX | Luxembourg | 322 | 49.6 | 6.2 | 18749 |
| LY | Lithuania | 314 | 54.5 | 25.5 | 17347 |
| LZ | Bulgaria | 284 | 42.7 | 23.3 | 17708 |
| OA | Peru | 111 | 12.1 | -77.1 | 10561 |
| OD | Lebanon | 271 | 33.9 | 35.5 | 16420 |
| OE | Austria | 303 | 48.2 | 16.3 | 18188 |
| OH | Finland | 326 | 60.2 | 25 | 17082 |
| OH0 | Aland Island | 330 | 60.2 | 20 | 17304 |
| OJ0 | Market Reef | 331 | 60.3 | 19 | 17338 |
| OK | Czech Republic | 311 | 50.1 | 14.4 | 18236 |
| OM | Slovak Republic | 306 | 49.1 | 16.4 | 18148 |
| ON | Belgium | 330 | 50.9 | 4.4 | 18724 |
| OX | Greenland | 33 | 64.2 | -51.7 | 16088 |
| OY | Faroe Islands | 3 | 62 | -6.8 | 17690 |
| OZ | Denmark | 328 | 55.7 | 12.6 | 17964 |
| P2 | Papua New Guinea | 315 | 5.2 | 145.6 | 4960 |
| P4 | Aruba | 98 | 12.1 | -69 | 13045 |
| P5 | North Korea | 324 | 39 | 126 | 10208 |
| PA | Netherlands | 333 | 52.4 | 4.9 | 18567 |
| PJ2 | Netherland Antilles | 98 | 12.1 | -69 | 13045 |
| PJ7 | Saint Maarten - Saba | 97 | 17.7 | -63.2 | 13922 |
| PY | Brazil | 143 | 23 | -43.2 | 11870 |
| PY0F | Fernando de Noronha | 144 | 3.9 | -32.4 | 14292 |
| PY0S | St Peter - Paul Rock | 144 | 1 | -29.4 | 14929 |
| PY0T | Trindade - Martin Is | 155 | 20.5 | -29.3 | 12725 |
| PZ | Surinam | 114 | 5.8 | -55.2 | 13680 |
| S0 | Western Sahara | 159 | 17 | -14 | 17210 |
| S2 | Bangladesh | 291 | 23.7 | 90.4 | 11311 |
| S5 | Slovenia | 290 | 44.5 | 16.4 | 18264 |
| S7 | Seychelles | 246 | 4.6 | 55.5 | 12095 |
| S9 | Sao Tome - Principe | 197 | 0.3 | 6.7 | 15351 |
| SM | Sweden | 330 | 59.3 | 18.1 | 17450 |
| SP | Poland | 311 | 52.2 | 21 | 17720 |
| ST | Sudan | 243 | 15.5 | 32.5 | 15461 |
| SU | Egypt | 261 | 30 | 31.4 | 16562 |
| SV | Greece | 271 | 38 | 23.7 | 17575 |
| SV/A | Mount Athos | 277 | 40.2 | 24.3 | 17585 |
| SV5 | Dodecanese | 271 | 36.4 | 28.2 | 17140 |
| SV9 | Crete | 266 | 35.4 | 25.5 | 17326 |
| T2 | Tuvalu | 6 | 8.7 | 178.6 | 3612 |
| T30 | West Kiribati | 357 | 1.4 | 173.2 | 4725 |
| T31 | Central Kiribati | 21 | 2.8 | -171.7 | 4449 |
| T32 | East Kiribati | 37 | 1.9 | -157.4 | 5519 |
| T33 | Banaba Island | 351 | 0.5 | 169.4 | 4548 |
| T5 | Somalia | 243 | 2.1 | 45.4 | 13405 |
| T7 | San Marino | 289 | 43.9 | 12.3 | 18596 |
| T9 | Bosnia-Hercegovina | 286 | 43.5 | 18.3 | 18117 |
| TA | Turkey | 280 | 40 | 31 | 17024 |
| TF | Iceland | 18 | 64.1 | -22 | 17228 |
| TG | Guatemala | 82 | 14.6 | -90.5 | 11423 |
| TI | Costa Rica | 89 | 9.9 | -84 | 11632 |
| TI9 | Cocos Island | 91 | 5.6 | -87 | 11070 |
| TJ | Cameroon | 206 | 3.9 | 11.5 | 15589 |

| | | | | | |
|-------|----------------------|-----|------|--------|-------|
| TK | Corsica Island | 280 | 42 | 9 | 18879 |
| TL | Central African Rep. | 215 | 4.5 | 18 | 15373 |
| TN | Congo | 207 | 4.3 | 15.3 | 14588 |
| TR | Gabon | 201 | 0.5 | 9 | 15310 |
| TT | Chad | 217 | 12.1 | 15 | 16277 |
| TU | Ivory Coast | 181 | 5.5 | -4 | 16073 |
| TY | Benin | 192 | 6.3 | 2.3 | 16100 |
| TZ | Mali | 173 | 12.7 | -8 | 16859 |
| UA | European Russia | 313 | 55.8 | 37.6 | 16569 |
| UA0 | Asiatic Russia | 335 | 48.5 | 135.1 | 10714 |
| UA2 | Kaliningrad | 319 | 55 | 20.5 | 17613 |
| UJ | Uzbekistan | 294 | 39.5 | 67 | 14116 |
| UN | Kazakhstan | 302 | 43.3 | 76.9 | 13575 |
| UR | Ukraine | 303 | 50.4 | 30.5 | 17131 |
| V2 | Antigua - Barbuda | 100 | 17 | -59.8 | 14155 |
| V3 | Belize | 80 | 17.3 | -88.8 | 11754 |
| V4 | St. Kitts - Nevis | 98 | 17.3 | -62.6 | 13944 |
| V5 | Namibia | 202 | 22.6 | 17.1 | 12597 |
| V6 | Micronesia ECI | 338 | 8 | 158.3 | 5725 |
| V7 | Marshall Islands | 350 | 9.1 | 167.3 | 5637 |
| V8 | Brunei | 294 | 4.9 | 114.9 | 7967 |
| VE | Canada | 60 | 43.7 | -79.4 | 14097 |
| VK | Australia | 268 | 37.8 | 145 | 2613 |
| VK0H | Heard Island | 221 | 53 | 73.4 | 7173 |
| VK0M | Macquarie Island | 213 | 54.7 | 158.8 | 1945 |
| VK9L | Lord Howe Island | 301 | 31.6 | 159.1 | 1784 |
| VK9M | Mellish Reef | 319 | 17.6 | 155.8 | 3202 |
| VK9N | Norfolk Island | 331 | 29 | 168 | 1492 |
| VK9W | Willis Island | 311 | 16 | 149.5 | 3726 |
| VK9X | Christmas Island | 275 | 10.5 | 105.7 | 7538 |
| VK9Y | Cocos-Keeling Island | 268 | 12.2 | 96.8 | 8164 |
| VP2E | Anguilla | 96 | 18.3 | -63 | 13980 |
| VP2M | Montserrat | 98 | 16.8 | -62.2 | 13943 |
| VP2V | British Virgin Is. | 95 | 18.4 | -64.6 | 13853 |
| VP5 | Turks - Caicos Is. | 87 | 22 | -72 | 13471 |
| VP6 | Pitcairn Island | 88 | 25.1 | -130.1 | 5299 |
| VP6/D | Ducie Is. | 91 | 24.7 | -124.8 | 5769 |
| VP8 | Falkland Islands | 149 | 51.7 | -57.9 | 8502 |
| VP8G | South Georgia Island | 161 | 54.3 | -38.8 | 8934 |
| VP8H | South Shetland Is. | 156 | 62 | -58.3 | 7602 |
| VP8O | South Orkney Island | 160 | 60.6 | -45.5 | 8128 |
| VP8S | South Sandwich Is. | 168 | 57.8 | -26.7 | 8842 |
| VP9 | Bermuda | 80 | 32.3 | -64.7 | 14693 |
| VQ9 | Chagos Island | 256 | 7.3 | 72.4 | 10545 |
| VR | Hong Kong | 306 | 22.3 | 114.3 | 9441 |
| VU | India | 277 | 19 | 72.8 | 12414 |
| VU7A | Andaman Island Is. | 284 | 11.7 | 92.8 | 10245 |
| VU7L | Laccadive Islands | 270 | 10 | 73 | 11769 |
| XE | Mexico | 72 | 19.4 | -99.1 | 11062 |
| XF4 | Revilla Gigedo | 65 | 19 | -111.5 | 10064 |
| XT | Burkina Faso | 186 | 12.4 | -1.6 | 16827 |
| XU | Cambodia | 292 | 11.7 | 104.8 | 9286 |
| XW | Laos | 295 | 18 | 102.6 | 9944 |
| XX9 | Macao | 305 | 22.2 | 113.6 | 9481 |
| XZ | Myanmar | 290 | 16.8 | 96 | 10366 |
| YA | Afghanistan | 289 | 34.4 | 69.2 | 13674 |
| YB | Indonesia | 280 | 6.2 | 106.8 | 7760 |
| YI | Iraq | 275 | 33 | 44.5 | 15623 |
| YJ | Vanuatu | 344 | 17.7 | 168.3 | 2680 |
| YK | Syria | 270 | 33.5 | 36.3 | 16334 |
| YL | Latvia | 321 | 57 | 24 | 17315 |
| YN | Nicaragua | 86 | 12 | -86 | 11614 |
| YO | Romania | 289 | 44.4 | 26.1 | 17494 |
| YS | El Salvador | 83 | 13.7 | -89.2 | 11467 |
| YT | Montenegro | 284 | 42.8 | 19.5 | 18018 |
| YU | Montenegro | 284 | 42.8 | 19.5 | 18018 |
| YU | Yugoslavia | 290 | 44.9 | 20.5 | 17937 |
| YV | Venezuela | 101 | 10.5 | -67 | 13095 |
| YV0 | Aves Island | 98 | 15.7 | -63.7 | 13741 |
| YZ | Montenegro | 284 | 42.8 | 19.5 | 18018 |
| Z2 | Zimbabwe | 217 | 17.8 | 31 | 12515 |
| Z3 | Macedonia | 290 | 44.5 | 16.4 | 18264 |
| ZA | Albania | 279 | 41.3 | 19.8 | 17979 |
| ZB | Gibraltar | 174 | 36.1 | -5.4 | 19476 |
| ZC4 | British Cyprus | 270 | 34.6 | 33 | 16662 |
| ZD7 | Saint Helena Island | 179 | 16 | -5.9 | 13681 |
| ZD8 | Ascension Island | 167 | 8 | -14.4 | 14483 |
| ZD9 | Tristan Da Cunha | 174 | 37.1 | -12.3 | 11300 |
| ZF | Cayman Islands | 83 | 19.5 | -81.2 | 12536 |
| ZK/N | North Cook Islands | 41 | 10.4 | -161 | 4126 |
| ZK/S | South Cook Islands | 54 | 21.2 | -159.8 | 3219 |
| ZK2 | Niue | 36 | 19 | -168.9 | 2876 |
| ZK3 | Tokelau Islands | 21 | 8.4 | -172.7 | 3819 |
| ZL | New Zealand | 218 | 43.5 | 172.6 | 351 |
| ZL7 | Chatham Island | 119 | 44 | -176.5 | 751 |
| ZL8 | Kermadec Island | 27 | 29.3 | -177.9 | 1444 |
| ZL9 | Auckland - Campbell | 209 | 50.7 | 166.5 | 1270 |
| ZP | Paraguay | 133 | 25.3 | -57.7 | 10846 |
| ZS | South Africa | 199 | 33.9 | 18.4 | 11360 |
| ZS8 | Prince Edward/Marion | 208 | 46.8 | 37.8 | 9388 |



GREAT CIRCLE BEARINGS FROM WELLINGTON.

QRP operation has a long history in New Zealand, in its many different forms, which include not only home constructing of equipment and lower power DX successes but also for portable use such as in the back country.

The origins

QRP is an abbreviation from the old official Q code that was used to speed up communications especially when using different languages and transmitting CW (Morse). These codes go right back to the days of spark transmissions.

QRP? = Shall I decrease transmitter power?

QRP, = with no question mark = Decrease transmitter power!

What watts is QRP?

Today QRP means operating with a transmitter output power of no more than 5 watts. Many hams get excellent results using much less even way down below 1 watt!

Many of the new digital modes such as PSK31 and Whisper, get surprising results using low power, in fact in most cases that's all that is needed.

With today's test equipment it is much easier to measure output power than to perform meaningful and accurate input calculations.

QRP Gear

Traditionally QRP gear has been homemade (homebrew), today many use low power commercial rigs. There are also now a large selection of kits available, some

can be purchased as a bare bones kit making them much more economical. But there now seems to be a resurgent's in building gear from scratch, from very simple rigs such as the Tuna tin 2 to multiband transceivers using more sophisticated technologies such as DDS.

The challenge of QRP

QRP appears to be one area of amateur radio that is expanding, one only has to look on the internet to see the very large number of sites dedicated to QRP operation through out the world. The large increase in the number of QRP kits available has helped to boost the interest and an interesting situation that has come about it that many of these kits feature in "how to build it" video's on the web site "You Tube". There are even sites for QRP homebrewers that have calculators for working out turns for coils, band-pass filter calculations and many more.

There is a real feeling of satisfaction when one has just completed a DX contact on QRP especially when it has been made on a set you have built yourself. There are a number of contest which include a QRP section such as our own Jock White Memorial Field day, also there are the "Straight key night" and the VK trans Tasman Contest along with the Trans-Tasman CW and digital modes contest with QRP sections. For a straight QRP contest there is the VK QRP hours Contest.



SSB QRP Transceiver

The ZL scene

Following a series of adverts in "Break In" for expressions of interest in forming a ZL QRP group which received an excellent response, a group has been formed. The first group newsletter was published at the beginning of July 2010 and appears to have been well received. It is hoped to produce at least four per year.

The group has attracted hams from across all fields of QRP with a large number of people very keen on building their own gear. It has been decided to provide a service within the group for obtaining parts from group purchasing, also technical help from the more advanced technical members of the group. Two or three people are looking into the QRP awards and contest situation in New Zealand.

If you are a keen QRP operator or equipment builder and would like to join the group do not hesitate to contact us via the contact details below.

A number of informal QRP nets take place on both 40 and 80 metres. The ZL-QRP group have decided meantime to use 3690kHz as its SSB listening frequency which is an internationally recognised QRP frequency.

Some members of the ZL-QRP group are keen trampers and from time to time can be heard from outdoor locations such as the Tararua Ranges, Nelson lakes, Stewart Island and many others. The availability of small light weight rigs and the ability to make small home brew rigs today have made this a much more interesting concept.

If interested in joining the ZL-QRP group contact -Phil Tarrant ZL2NJ, P.O. Box 55, Wanganui 4540, or Email philtar@xtra.co.nz.

Also contact Phil ZL2NJ to join the G-QRP club or to purchase the G-QRP clubs latest CD which includes all copies of Sprat from issue 1 to issue 140.



DSB QRP Transceiver

The GQRP Club

Formed in 1974, the GQRP Club is a non profit organisation run entirely by volunteers to promote Low Power Radio. Whether you have a ham license or not—everyone is welcome. Our quarterly magazine SPRAT provides a fascinating read containing articles of varying complexity, from simple test equipment, to fully functioning radio transmitters and receivers. Membership fees are about as low as you will find anywhere and our club sales service to members is second to none. New Zealand membership Cost \$NZ28.00, contact :- Phil Tarrant ZL2NJ, P.O. Box 55, Wanganui 4540. Email—Philtar@xtra.co.nz, to join or for further details.

Communication with neighbouring stations by ground waves is not affected by conditions in the upper atmosphere. In contrast all HF communications beyond, at the most, a few tens of kilometres depend on the presence of a layer of gases so strongly ionized as to act as a reflector for skywave signals. These signals projected at the correct angle, will be directed down to the desired destination, either in one hop or by successive hops around the curvature of the earth.

The ionization of the atmospheric gases is renewed each day by ultra-violet radiation from the sun. In the lowest layers (D and E) the density of ions decreases rapidly as the sun goes down, but in the higher F region the ionisation lasts longer and diminishes slowly through the night. The strength of the ionising radiation itself is liable to fluctuate from day to day and week to week. Observatories monitor the state of the ionosphere by sweeping through the HF spectrum with pulses directed vertically upward, timing the echoes to determine the virtual height of the reflecting layer, and noting the critical penetration frequency (f_0) above which reflections cease.

Radio waves impinging obliquely on the ionised layer can be reflected on higher frequencies that are related to f_0 by an obliquity factor.

Thus, for example, with an F layer at 300 km, the required radiation angle above the horizon and the maximum usable frequency (MUF) for various distances would be:

0 km 90° $1.0 \times f_0$
500 km 48° $1.3 \times f_0$
1,000 km 28° $1.9 \times f_0$
2,000 km 14° $2.7 \times f_0$
3,000 km 4° $3.4 \times f_0$

For instance, when the critical frequency (f_0) is 3 MHz the MUF for a 1000 km path is 1.9×3 MHz = 5.7 MHz.

This path would be useable on 40 m (MUF = 7 MHz) if the critical frequency increased to $7 \div 1.9 = 3.7$ MHz.

Signals suffer power loss at every reflection and at every passage through the daytime D and E regions. The lower the frequency the more severe the loss—halving the frequency quadruples the loss. The lowest frequency to give a readable signal at the other end, in spite of losses, depends in part on the effective power radiated at the appropriate angle. Thus the lowest usable frequency (LUF) or absorption-limited frequency (ALF) is not a sharply defined limit applying to all stations like the MUF.

The IARU-NCDXF^[1] worldwide network of beacons in continuous operation on five amateur bands, and cycling through four power levels, provides a convenient means

of sampling current propagation conditions to other parts of the world (see Figure 1 overleaf). The full 18-beacon sequence on any band can be scanned in only three minutes.

For planning ahead it is usual to make use of predictions of the MUF and LUF based on the historical data provided by ionospheric observatories and averaged for different levels of solar activity.

For a long time the main indicator of solar activity was the sunspot number, but the measurements of microwave radiation from the sun, begun at Ottawa in 1946, have proved more relevant to ionospheric conditions. The solar flux index is the measurement made at local noon (now at Penticton, British Columbia) on 2.8 GHz.^[2]

This is not the ionising radiation, but is something measurable at the ground that seems to vary in parallel with the ionizing radiations that maintain the ionosphere.

If an estimate can be made of the level of solar activity likely to apply at the time of interest, computers can sort through the world maps of averaged past data and extract the most probable MUFs at the required reflection points, at the relevant time, month and activity level. With considerable simplification, some very convenient programs have been produced for PCs.^[3] Most try to predict median values of MUF for a path, but to allow for the normal day-to-day variations of ionospheric conditions over a month many also indicate the expected upper decile (UD) value of MUF (likely to be exceeded on about 10 per cent of days) and the lower decile (LD) values (below which the MUF is likely to fall on the worst 10 per cent of days).

Commercial stations normally set their frequencies some distance below the expected median MUFs to minimise the disruptions of schedules on “bad” days, and for this purpose often designate the LD as their optimum working frequency (OWF). This, however, is a compromise frequency—the best propagation is normally to be found just below the actual MUF at the time, which on a “good” day may be 15 per cent or more above the predicted median MUF. Although predictions of median MUFs such as those in *Break-In* may not always fit conditions

on particular days very well, the predictions will still give useful indications of the best and worst times to try to communicate with distant places.

Most HF communications within New Zealand are by single-hop sky wave, requiring a medium to high take-off angle. Most amateur contacts need radiation angles above $40\text{--}45^\circ$, few need radiation below 30° to reach the remainder of the country.

At the steep angles needed for nearby communications, signals on the higher frequency bands will penetrate the ionized layers and be lost to space, though lower-angled rays may still be reaching more distant stations. This skip over surrounding areas is most frequent and extensive when the ionisation is weak, notably at night, in the winter winter, and in the years of low activity. Amateurs (including AREC) can usually keep nearby contacts on the 3.5 MHz band, while SAR and CD can change to their lower “night” frequencies. In contrast to local communications, long distance contacts are favoured by the lowest practicable radiation angles in order to maximise the usable frequency, minimise the number of hops needed, and avoid unnecessary absorption losses.

Bursts of X-rays from solar flares can cause immediate intensification of ionisation, notably in the D-region, over sunlit portions of the earth, causing sudden shortwave fadeouts. Clouds of charged particles ejected from the sun, and travelling more slowly, may be by satellite as a satellite proton event (SPE); they can interact with the earth's magnetic field, causing distortions of the field that are indicated by increases in the

three-hourly geomagnetic K-index and the 24-hourly A-index, and themselves be deflected towards the magnetic poles to produce enhanced auroral displays, degraded radio propagation across the auroral zone, and perhaps severe polar cap absorption (PCA).^[4]

Summary

For long distance contacts use the lowest practicable radiation angle and the highest frequency usable at the time; listen to the beacons for an overview of propagation in different directions (and take great care not to transmit on the beacon frequencies!); listen to the hourly broadcasts from WWV^[5] or WWVH for the solar flux and K and A indices (and do not expect great propagation across the auroral regions if the

geomagnetic field is disturbed); consult monthly predictions of median MUFs in *Break-In* or on PCs but be prepared for MUFs to be 15 per cent or more above the predicted medians on good days and 15 per cent or more below on bad days.

For domestic communications within New Zealand expect to do best with a medium to high radiation angle and a frequency low enough to avoid skip over the desired paths, but still use the highest band that is usable in order to minimise losses and multipath fading.

References

- [1] The Northern California DX Foundation website (<www.ncdxf.org>) has pages on beacons, including sites, call-signs, schedules, propagation software and software to monitor the beacons using a sound card.
- [2] The Penticton/Ottawa 2.8 GHz solar flux index observations are now displayed on [4] below. Select “Solar cycle progression” in the “Popular pages” box.
- [3] Propagation prediction software is available through links on most websites in this reference list.
- [4] “Space weather” is the current jargon for solar activity and its influence on the earth. One web site is the Space Weather Prediction Center of the US National Oceanic and Atmospheric Administration (<www.swpc.noaa.gov>). The NZART website also has the NOAA solar-terrestrial data, updated every three hours.
- [5] There is a WWV website at www.tf.nist.gov.

Learning about propagation

The RSGB Propagation Studies Committee has a very comprehensive website at <www.keele.ac.uk/depts/por/psc.htm> with a listing “relating to radio propagation at all levels from introductory to professional”. There are also numerous links to web sites in this list, and to many others related to propagation. Two ionospheric organisations who are responsible for collecting ionospheric observations also have very good education sections on propagation. They are <www.swpc.noaa.gov> (see [4] above) and the Australian Space Weather Agency (<www.ips.gov.au>). The latest hourly ionogram from the Eyrewell ionosonde near Christchurch is available at (<www2.phys.canterbury.ac.nz/~physion/ionogram.html>).

ALLOCATION OF INTERNATIONAL CALL-SIGNS

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Call Sign Allocated to Series

| | |
|------------|--|
| AAA-ALZ | United States of America |
| AMA-AOZ | Spain |
| APA-ASZ | Pakistan (Islamic Republic of) |
| ATA-AWZ | India (Republic of) |
| AXA-AXZ | Australia |
| AYA-AZZ | Argentine Republic |
| A2A-A2Z | Botswana (Republic of) |
| A3A-A3Z | Tonga (Kingdom of) |
| A4A-A4Z | Oman (Sultanate of) |
| A5A-A5Z | Bhutan (Kingdom of) |
| A6A-A6Z | United Arab Emirates |
| A7A-A7Z | Qatar (State of) |
| A8A-A8Z | Liberia (Republic of) |
| A9A-A9Z | Bahrain (State of) |
| BAA-BZZ | China (People's Republic of) |
| CAA-CEZ | Chile |
| CFA-CKZ | Canada |
| CLA-CMZ | Cuba |
| CNA-CNZ | Morocco (Kingdom of) |
| COA-COZ | Cuba |
| CPA-CPZ | Bolivia (Republic of) |
| CQA-CUZ | Portugal |
| CVA-CXZ | Uruguay (Eastern Republic of) |
| CYA-CZZ | Canada |
| C2A-C2Z | Nauru (Republic of) |
| C3A-C3Z | Andorra (Principality of) |
| C4A-C4Z | Cyprus (Republic of) |
| C5A-C5Z | Gambia (Republic of the) |
| C6A-C6Z | World Meters (Commonwealth of) |
| * C7A-C7Z | World Meteorological Organisation |
| C8A-C9Z | Mozambique (Republic of) |
| DAA-DRZ | Germany (Federal Republic of) |
| DSA-DTZ | Korea (Republic of) |
| DUA-DZZ | Philippines (Republic of the) |
| D2A-D3Z | Angola (Republic of) |
| D4A-D4Z | Cape Verde (Republic of) |
| D5A-D5Z | Liberia (Republic of) |
| D6A-D6Z | Comoros (Islamic Federal Republic of the) |
| D7A-D9Z | Korea (Republic of) |
| EAA-EHZ | Spain |
| EIA-EJZ | Ireland |
| EKA-EKZ | Armenia (Republic of) |
| ELA-ELZ | Liberia (Republic of) |
| EMA-EOZ | Ukraine |
| EPA-EQZ | Iran (Islamic Republic of) |
| ERA-ERZ | Moldova (Republic of) |
| ESA-ESZ | Estonia (Republic of) |
| ETA-ETZ | Ethiopia (Federal Democratic Republic of) |
| EUA-EWZ | Belarus (Republic of) |
| EXA-EXZ | Kyrgyz Republic |
| EYA-EYZ | Tajikistan (Republic of) |
| EZA-EZZ | Turkmenistan |
| E2A-E2Z | Thailand |
| E3A-E3Z | Eritrea |
| ** E4A-E4Z | Palestinian Authority |
| E5A-E5Z | New Zealand - Cook Islands (WRC-07) |
| E7A-E7Z | Bosnia and Herzegovina (Republic of) (WRC-07) |
| FAA-FZZ | France |
| GAA-GZZ | United Kingdom of Great Britain and Northern Ireland |
| HAA-HAZ | Hungary (Republic of) |
| HBA-HBZ | Switzerland (Confederation of) |
| HCA-HDZ | Ecuador |
| HEA-HEZ | Switzerland (Confederation of) |
| HFA-HFZ | Poland (Republic of) |

Call Sign Allocated to Series

| | |
|---------|--|
| HGA-HGZ | Hungary (Republic of) |
| HHH-HHZ | Haiti (Republic of) |
| HIA-HIZ | Dominican Republic |
| HJA-HKZ | Colombia (Republic of) |
| HLA-HLZ | Korea (Republic of) |
| HMA-HMZ | Democratic People's Republic of Korea |
| HNA-HNZ | Iraq (Republic of) |
| HOA-HPZ | Panama (Republic of) |
| HQA-HRZ | Honduras (Republic of) |
| HSA-HSZ | Thailand |
| HTA-HTZ | Nicaragua |
| HUA-HUZ | El Salvador (Republic of) |
| HVA-HVZ | Vatican City State |
| HWA-HYZ | France |
| HZA-HZZ | Saudi Arabia (Kingdom of) |
| H2A-H2Z | Cyprus (Republic of) |
| H3A-H3Z | Panama (Republic of) |
| H4A-H4Z | Solomon Islands |
| H6A-H7Z | Nicaragua |
| H8A-H9Z | Panama (Republic of) |
| IAA-IZZ | Italy |
| JAA-JSZ | Japan |
| JTA-JVZ | Mongolia |
| JWA-JXZ | Norway |
| JYA-JYZ | Jordan (Hashemite Kingdom of) |
| JZA-JZZ | Indonesia (Republic of) |
| J2A-J2Z | Djibouti (Republic of) |
| J3A-J3Z | Grenada |
| J4A-J4Z | Greece |
| J5A-J5Z | Guinea-Bissau (Republic of) |
| J6A-J6Z | Saint Lucia |
| J7A-J7Z | Dominica (Commonwealth of) |
| J8A-J8Z | Saint Vincent and the Grenadines |
| KAA-KZZ | United States of America |
| LAA-LNZ | Norway |
| LOA-LWZ | Argentine Republic |
| LXA-LXZ | Luxembourg |
| LYA-LYZ | Lithuania (Republic of) |
| LZA-LZZ | Bulgaria (Republic of) |
| L2A-L9Z | Argentine Republic |
| MAA-MZZ | United Kingdom of Great Britain and Northern Ireland |
| NAA-NZZ | United States of America |
| OAA-OCZ | Peru |
| ODA-ODZ | Lebanon |
| OEA-OEZ | Austria |
| OFA-OJZ | Finland |
| OKA-OLZ | Czech Republic |
| OMA-OMZ | Slovak Republic |
| ONA-OTZ | Belgium |
| OUA-OZZ | Denmark |
| PAA-PIZ | Netherlands (Kingdom of the) |
| PJA-PJZ | Netherlands (Kingdom of the) - Netherlands Antilles |
| PKA-POZ | Indonesia (Republic of) |
| PPA-PYZ | Brazil (Federative Republic of) |
| PZA-PZZ | Suriname (Republic of) |
| P2A-P2Z | Papua New Guinea |
| P3A-P3Z | Cyprus (Republic of) |
| P4A-P4Z | Netherlands (Kingdom of the) - Aruba |
| P5A-P9Z | Democratic People's Republic of Korea |
| RAA-RZZ | Russian Federation |
| SAA-SMZ | Sweden |
| SNA-SRZ | Poland (Republic of) |
| SSA-SSM | Egypt (Arab Republic of) |
| SSN-STZ | Sudan (Republic of the) |
| SUA-SUZ | Egypt (Arab Republic of) |

Call Sign Allocated to Series

| | |
|---------|--|
| SVA-SZZ | Greece |
| S2A-S3Z | Bangladesh (People's Republic of) |
| S5A-S5Z | Slovenia (Republic of) |
| S6A-S6Z | Singapore (Republic of) |
| S7A-S7Z | Seychelles (Republic of) |
| S8A-S8Z | South Africa (Republic of) |
| S9A-S9Z | Sao Tome and Principe (Democratic Republic of) |
| TAA-TCZ | Turkey |
| TDA-TDZ | Guatemala (Republic of) |
| TEA-TEZ | Costa Rica |
| TFA-TFZ | Iceland |
| TGA-TGZ | Guatemala (Republic of) |
| THA-THZ | France |
| TIA-TIZ | Costa Rica |
| TJA-TJZ | Cameroon (Republic of) |
| TKA-TKZ | France |
| TLA-TLZ | Central African Republic |
| TMA-TMZ | France |
| TNA-TNZ | Congo (Republic of the) |
| TOA-TQZ | France |
| TRA-TRZ | Gabonese Republic |
| TSA-TSZ | Tunisia |
| TTA-TTZ | Chad (Republic of) |
| TUA-TUZ | Côte d'Ivoire (Republic of) |
| TVA-TXZ | France |
| TYA-TYZ | Benin (Republic of) |
| TZA-TZZ | Mali (Republic of) |
| T2A-T2Z | Tuvalu |
| T3A-T3Z | Kiribati (Republic of) |
| T4A-T4Z | Cuba |
| T5A-T5Z | Somali Democratic Republic |
| T6A-T6Z | Afghanistan (Islamic State of) |
| T7A-T7Z | San Marino (Republic of) |
| T8A-T8Z | Palau (Republic of) |
| UAA-UIZ | Russian Federation |
| UJA-UMZ | Uzbekistan (Republic of) |
| UNA-UQZ | Kazakhstan (Republic of) |
| URA-UZZ | Ukraine |
| VAA-VGZ | Canada |
| VHA-VNZ | Australia |
| VOA-VOZ | Canada |
| VPA-VQZ | United Kingdom of Great Britain and Northern Ireland |
| VRA-VRZ | China (People's Republic of) - Hong Kong |
| VSA-VSZ | United Kingdom of Great Britain and Northern Ireland |
| VTA-VWZ | India (Republic of) |
| VXA-VYZ | Canada |
| VZA-VZZ | Australia |
| V2A-V2Z | Antigua and Barbuda |
| V3A-V3Z | Belize |
| V4A-V4Z | Saint Kitts and Nevis |
| V5A-V5Z | Namibia (Republic of) |
| V6A-V6Z | Micronesia (Federated States of) |
| V7A-V7Z | Marshall Islands (Republic of the) |
| V8A-V8Z | Brunei Darussalam |
| WAA-WZZ | United States of America |
| XAA-XIZ | Mexico |
| XJA-XOZ | Canada |
| XPA-XPZ | Denmark |
| XQA-XRZ | Chile |
| XSA-XSZ | China (People's Republic of) |
| XTA-XTZ | Burkina Faso |
| XUA-XUZ | Cambodia (Kingdom of) |
| XVA-XVZ | Viet Nam (Socialist Republic of) |
| XWA-XWZ | Lao People's Democratic Republic |
| XXA-XXZ | China (People's Republic of) - Macao (WRC-07) |

Call Sign Allocated to Series

| | |
|---------|--|
| XYA-XXX | Myanmar (Union of) |
| YAA-YAZ | Afghanistan (Islamic State of) |
| YBA-YHZ | Indonesia (Republic of) |
| YIA-YIZ | Iraq (Republic of) |
| YJA-YJZ | Vanuatu (Republic of) |
| YKA-YKZ | Syrian Arab Republic |
| YLA-YLZ | Latvia (Republic of) |
| YMA-YMZ | Turkey |
| YNA-YNZ | Nicaragua |
| YOA-YRZ | Romania |
| YSA-YSZ | El Salvador (Republic of) |
| YTA-YUZ | Serbia (Republic of) (WRC-07) |
| YVA-YYZ | Venezuela (Republic of) |
| Y2A-Y9Z | Germany (Federal Republic of) |
| ZAA-ZAZ | Albania (Republic of) |
| ZBA-ZJZ | United Kingdom of Great Britain and Northern Ireland |
| ZKA-ZMZ | New Zealand |
| ZNA-ZOZ | United Kingdom of Great Britain and Northern Ireland |
| ZPA-ZPZ | Paraguay (Republic of) |
| ZQA-ZQZ | United Kingdom of Great Britain and Northern Ireland |
| ZRA-ZUZ | South Africa (Republic of) |
| ZVA-ZZZ | Brazil (Federative Republic of) |
| Z2A-Z2Z | Zimbabwe (Republic of) |
| Z3A-Z3Z | The Former Yugoslav Republic of Macedonia |
| 2AA-2ZZ | United Kingdom of Great Britain and Northern Ireland |
| 3AA-3AZ | Monaco (Principality of) |
| 3BA-3BZ | Mauritius (Republic of) |
| 3CA-3CZ | Equatorial Guinea (Republic of) |
| 3DA-3DM | Swaziland (Kingdom of) |
| 3DN-3DZ | Fiji (Republic of) |
| 3EA-3FZ | Panama (Republic of) |
| 3GA-3GZ | Chile |
| 3HA-3UZ | China (People's Republic of) |
| 3VA-3VZ | Tunisia |
| 3WA-3WZ | Viet Nam (Socialist Republic of) |
| 3XA-3XZ | Guinea (Republic of) |
| 3YA-3YZ | Norway |

Call Sign Allocated to Series

| | |
|-----------|---|
| 3ZA-3ZZ | Poland (Republic of) |
| 4AA-4CZ | Mexico |
| 4DA-4IZ | Philippines (Republic of the) |
| 4JA-4KZ | Azerbaijani Republic |
| 4LA-4LZ | Georgia (Republic of) |
| 4MA-4MZ | Venezuela (Republic of) |
| 4OA-4OZ | Montenegro (Republic of) |
| | (WRC-07) |
| 4PA-4SZ | Sri Lanka (Democratic Socialist Republic of) |
| 4TA-4TZ | Peru |
| * 4UA-4UZ | United Nations |
| 4VA-4VZ | Haiti (Republic of) |
| 4WA-4WZ | Democratic Republic of Timor-Leste (WRC-03) |
| 4XA-4XZ | Israel (State of) |
| * 4YA-4YZ | International Civil Aviation Organization |
| 4ZA-4ZZ | Israel (State of) |
| 5AA-5AZ | Libya (Socialist People's Libyan Arab Jamahiriya) |
| 5BA-5BZ | Cyprus (Republic of) |
| 5CA-5GZ | Morocco (Kingdom of) |
| 5HA-5IZ | Tanzania (United Republic of) |
| 5JA-5KZ | Colombia (Republic of) |
| 5LA-5MZ | Liberia (Republic of) |
| 5NA-5OZ | Nigeria (Federal Republic of) |
| 5PA-5QZ | Denmark |
| 5RA-5SZ | Madagascar (Republic of) |
| 5TA-5TZ | Mauritania (Islamic Republic of) |
| 5UA-5UZ | Niger (Republic of the) |
| 5VA-5VZ | Togolese Republic |
| 5WA-5WZ | Samoa (Independent State of) |
| 5XA-5XZ | Uganda (Republic of) |
| 5YA-5ZZ | Kenya (Republic of) |
| 6AA-6BZ | Egypt (Arab Republic of) |
| 6CA-6CZ | Syrian Arab Republic |
| 6DA-6JZ | Mexico |
| 6KA-6NZ | Korea (Republic of) |
| 6OA-6OZ | Somali Democratic Republic |
| 6PA-6SZ | Pakistan (Islamic Republic of) |
| 6TA-6UZ | Sudan (Republic of the) |

Call Sign Allocated to Series

| | |
|---------|---|
| 6VA-6WZ | Senegal (Republic of) |
| 6XA-6XZ | Madagascar (Republic of) |
| 6YA-6YZ | Jamaica |
| 6ZA-6ZZ | Liberia (Republic of) |
| 7AA-7TZ | Indonesia (Republic of) |
| 7JA-7NZ | Japan |
| 7OA-7OZ | Yemen (Republic of) |
| 7PA-7PZ | Lesotho (Kingdom of) |
| 7QA-7QZ | Malawi |
| 7RA-7RZ | Algeria (People's Democratic Republic of) |
| 7SA-7SZ | Sweden |
| 7TA-7YZ | Algeria (People's Democratic Republic of) |
| 7ZA-7ZZ | Saudi Arabia (Kingdom of) |
| 8AA-8IZ | Indonesia (Republic of) |
| 8JA-8NZ | Japan |
| 8OA-8OZ | Botswana (Republic of) |
| 8PA-8PZ | Barbados |
| 8QA-8QZ | Maldives (Republic of) |
| 8RA-8RZ | Guyana |
| 8SA-8SZ | Sweden |
| 8TA-8YZ | India (Republic of) |
| 8ZA-8ZZ | Saudi Arabia (Kingdom of) |
| 9AA-9AZ | Croatia (Republic of) |
| 9BA-9DZ | Iran (Islamic Republic of) |
| 9EA-9FZ | Ethiopia (Federal Democratic Republic of) |
| 9GA-9GZ | Ghana |
| 9HA-9HZ | Malta |
| 9IA-9JZ | Zambia (Republic of) |
| 9KA-9KZ | Kuwait (State of) |
| 9LA-9LZ | Sierra Leone |
| 9MA-9MZ | Malaysia |
| 9NA-9NZ | Nepal |
| 9OA-9TZ | Democratic Republic of the Congo |
| 9UA-9UZ | Burundi (Republic of) |
| 9VA-9VZ | Singapore (Republic of) |
| 9WA-9WZ | Malaysia |
| 9XA-9XZ | Rwandese Republic |
| 9YA-9ZZ | Trinidad and Tobago |

THE PHONETIC ALPHABET

The Phonetic Alphabet should be used with considerable discretion. Its primary purpose is to obviate confusion between letters and figures which have similar sounds, e.g.: BCDEGPTV, AKJ, MN, QU, FS, TWO, THREE, FIVE, NINE.

The possibility of confusion increases greatly under adverse operating conditions such as adjacent channel interference, high level of acoustic and electrical background noise, poor audio quality (including inferior articulation), fading, etc. Under

these conditions more frequent use of the phonetic code may be necessary. However, when there is a complete absence of interference of any kind and signals are perfectly readable, phonetics can be eliminated except for difficult place names, prop-

er names, and unusual words. Regardless of the quality of the circuit phonetics should always be used for call-signs during the establishment of initial contact. It is important to memorize the code thoroughly and to avoid using substitute words.

Phonetic Alphabet

Some words are likely to be misunderstood when passed over radio telephone circuits, due to phonetic similarity. A number of phonetic alphabets have been introduced to overcome this. The following being the most generally accepted at the present time.

| | | | | | |
|---|----------|-------------|-------|---------|-----------------------------|
| A | ALFA | AL fah | P | PAPA | pah PAH |
| B | BRAVO | BRAH voh | Q | QUEBEC | Kwee BECK or Key BECK |
| C | CHARLIE | CHAR lee | R | ROMEO | ROW me oh |
| D | DELTA | DELL tah | S | SIERRA | See AIR rah |
| E | ECHO | ECK oh | T | TANGO | TANG go |
| F | FOXTROT | FOKS trot | U | UNIFORM | YOU nee form or OO nee form |
| G | GOLF | GOLF | V | VICTOR | VIK tor |
| H | HOTEL | hoh TELL | W | WHISKEY | WISS key |
| I | INDIA | IN dee ah | X | X-RAY | ECKS ray |
| J | JULIET | JEW lee ETT | Y | YANKEE | YANG kee |
| K | KILO | KEY loh | Z | ZULU | ZOO loo |
| L | LIMA | LEE mah | | | |
| M | MIKE | MIKE | | | |
| N | NOVEMBER | no VEM ber | 1 WUN | 2 TOO | 3 thuh-REE |
| O | OSCAR | OSS cah | 6 SIX | 7 seVEN | 8 AIT |
| | | | | | 4 FO-wer |
| | | | | | 5 FI-yiv |
| | | | | | 9 NI-ner |
| | | | | | 0 ZERO |

DX CENTURY CLUB COUNTRIES LIST

Reproduced Courtesy ARRL July 2010
Amateur Data Interchange Format (ADIF) Codes Reproduced Courtesy www.adif.org Version 2

| Notes | Prefix | Entity | Continent | ITU | CQ | ADIF Codes |
|-------|----------|---------------------------|-----------|-----|-------|------------|
| | 1 | Sov. Mil. Order of Malta | EU | 28 | 15 | 246 |
| | 1 | Spratty Is. | AS | 50 | 26 | 247 |
| F | 3A | Monaco | EU | 27 | 14 | 260 |
| | 3B6, 7 | Agalega & St. Brandon Is. | AF | 53 | 39 | 4 |
| F | 3B8 | Mauritius | AF | 53 | 39 | 444 |
| | 3B9 | Rodriguez I. | AF | 53 | 39 | 204 |
| | 3C | Equatorial Guinea | AF | 47 | 36 | 49 |
| | 3C0 | Annobon I. | AF | 52 | 36 | 195 |
| F | 3D2 | Fiji | OC | 56 | 32 | 176 |
| F | 3D2 | Conway Reef | OC | 56 | 32 | 489 |
| F | 3D2 | Rotuma I. | OC | 56 | 32 | 275 |
| T | 3DA | Swaziland | AF | 57 | 38 | 468 |
| F | 3V | Tunisia | AF | 37 | 33 | 474 |
| | 3W, XV | Vietnam | AS | 49 | 26 | 293 |
| | 3X | Guinea | AF | 46 | 35 | 107 |
| F | 3Y | Bouvet | AF | 67 | 38 | 24 |
| F | 3Y | Peter I I. | AN | 72 | 12 | 136 |
| | 4J, 4K | Azerbaijan | AS | 29 | 21 | 18 |
| F | 4L | Georgia | AS | 29 | 21 | 75 |
| F,47 | 4O | Montenegro | EU | 28 | 15 | 514 |
| F | 4S | Sri Lanka | AS | 41 | 22 | 315 |
| F,T | 4U | ITU HQ | EU | 28 | 14 | 248 |
| F | 4U | UN United Nations HQ | NA | 08 | 05 | 289 |
| 44 | 4W | Timor-Leste | OC | 54 | 28 | 511 |
| F,T | 4X, 4Z | Israel | AS | 39 | 20 | 336 |
| | 5A | Libya | AF | 38 | 34 | 2 |
| F | 5B,C4,P3 | Cyprus | AS | 39 | 20 | 215 |
| F | 5H-5I | Tanzania | AF | 53 | 37 | 470 |
| F | 5N | Nigeria | AF | 46 | 35 | 450 |
| | 5R | Madagascar | AF | 53 | 39 | 438 |
| 2 | 5T | Mauritania | AF | 46 | 35 | 444 |
| 3 | 5U | Niger | AF | 46 | 35 | 187 |
| | 5V | Togo | AF | 46 | 35 | 483 |
| F | 5W | Samoa | OC | 62 | 32 | 190 |
| F | 5X | Uganda | AF | 48 | 37 | 286 |
| F | 5Y-5Z | Kenya | AF | 48 | 37 | 430 |
| F,4 | 6V-6W | Senegal | AF | 46 | 35 | 456 |
| F,T | 6Y | Jamaica | NA | 11 | 08 | 82 |
| 5 | 7O | Yemen | AS | 39 | 21,37 | 492 |
| F | 7P | Lesotho | AF | 57 | 38 | 432 |
| | 7Q | Malawi | AF | 53 | 37 | 440 |
| F | 7T-7Y | Algeria | AF | 37 | 33 | 400 |
| F | 8P | Barbados | NA | 11 | 08 | 62 |
| | 8Q | Maldives | AS/AF | 41 | 22 | 159 |
| F,T | 8R | Guyana | SA | 12 | 09 | 129 |
| F,6 | 9A | Croatia | EU | 28 | 15 | 497 |
| F,T,7 | 9G | Ghana | AF | 46 | 35 | 424 |
| F | 9H | Malta | EU | 28 | 15 | 257 |
| F | 9I-9J | Zambia | AF | 53 | 36 | 482 |
| F | 9K | Kuwait | AS | 39 | 21 | 348 |
| T | 9L | Sierra Leone | AF | 46 | 35 | 458 |
| F,8 | 9M2, 4 | West Malaysia | AS | 54 | 28 | 299 |
| F,8 | 9M6, 8 | East Malaysia | OC | 54 | 28 | 46 |
| | 9N | Nepal | AS | 42 | 22 | 369 |
| F | 9Q-9T | Dem Rep. of Congo | AF | 52 | 36 | 243 |
| 9 | 9U | Burundi | AF | 52 | 36 | 404 |
| F,10 | 9V | Singapore | AS | 54 | 28 | 381 |

| Notes | Prefix | Entity | Continent | ITU | CQ | ADIF Codes |
|--------|---------|--------------------------|-----------|-------|-------|------------|
| | 9 | X Rwanda | AF | 52 | 36 | 454 |
| T,F | 9Y-9Z | Trinidad & Tobago | SA | 11 | 09 | 90 |
| F | A2 | Botswana | AF | 57 | 38 | 402 |
| | A3 | Tonga | OC | 62 | 32 | 160 |
| F | A4 | Oman | AS | 39 | 21 | 370 |
| | A5 | Bhutan | AS | 41 | 22 | 306 |
| | A6 | United Arab Emirates | AS | 39 | 21 | 391 |
| F | A7 | Qatar | AS | 39 | 21 | 376 |
| F | A9 | Bahrain | AS | 39 | 21 | 304 |
| F | AP | Pakistan | AS | 41 | 21 | 372 |
| 11 | BS7 | Scarborough Reef | AS | 50 | 27 | 506 |
| F | BV | Taiwan | AS | 44 | 24 | 386 |
| 12 | BV9P | Pratas I. | AS | 44 | 24 | 200 |
| F | B | China | AS | (A) | 23,24 | 318 |
| | C2 | Nauru | OC | 65 | 31 | 157 |
| F | C3 | Andorra | EU | 27 | 14 | 203 |
| T | C5 | The Gambia | AF | 46 | 35 | 422 |
| | C6 | Bahamas | NA | 11 | 08 | 60 |
| F | C8-9 | Mozambique | AF | 53 | 37 | 181 |
| F,T | CA-CE | Chile | SA | 14,16 | 12 | 112 |
| F,T | CE0Y | Easter I. | SA | 63 | 12 | 46 |
| F,T | CE0Z | Juan Fernandez Is. | SA | 14 | 12 | 125 |
| F,T | CE0X | San Felix & San Ambrosio | SA | 14 | 12 | 217 |
| F,S | CE9/KC4 | Antarctica | AN | (B) | (C) | 13 |
| F,T | CM, CO | Cuba | NA | 11 | 08 | 41 |
| | CN | Morocco | AF | 37 | 33 | 446 |
| F,T | CP | Bolivia | SA | 12,14 | 10 | 104 |
| F | CT | Portugal | EU | 37 | 14 | 272 |
| F | CT3 | Madeira Is. | AF | 36 | 33 | 256 |
| F | CU | Azores | EU | 36 | 14 | 149 |
| F,T | CV-CX | Uruguay | SA | 14 | 13 | 144 |
| F | CY0 | Sable I. | NA | 09 | 05 | 210 |
| F | CY9 | St. Paul I. | NA | 09 | 05 | 516 |
| | D2-3 | Angola | AF | 52 | 36 | 401 |
| F | D4 | Cape Verde | AF | 46 | 35 | 409 |
| F,T,13 | D6 | Comoros | AF | 53 | 39 | 411 |
| F,14 | DA-DR | Fed. Rep. of Germany | EU | 28 | 14 | 230 |
| F,T | DU-DZ | Philippines | OC | 50 | 27 | 375 |
| 15 | E3 | Eritrea | AF | 48 | 37 | 51 |
| 43 | E4 | Palestine | AS | 39 | 20 | 510 |
| | E5 | N. Cook Is. | OC | 62 | 32 | 191 |
| | E5 | S. Cook Is. | OC | 62 | 32 | 234 |
| F,T,29 | E7 | Bosnia-Herzegovina | EU | 28 | 15 | 501 |
| F | EA-EH | Spain | EU | 37 | 14 | 281 |
| F | EA6-EH6 | Balearic Is. | EU | 37 | 14 | 21 |
| F | EA8-EH8 | Canary Is. | AF | 36 | 33 | 29 |
| F | EA9-EH9 | Ceuta & Melilla | AF | 37 | 33 | 32 |
| F | EI-EJ | Ireland | EU | 27 | 14 | 245 |
| F | EK | Armenia | AS | 29 | 21 | 14 |
| F,T | EL | Liberia | AF | 46 | 35 | 434 |
| F | EP-EQ | Iran | AS | 40 | 21 | 330 |
| F | ER | Moldova | EU | 29 | 16 | 179 |
| F | ES | Estonia | EU | 29 | 15 | 52 |
| F | ET | Ethiopia | AF | 48 | 37 | 53 |
| F | EU- | EW Belarus | EU | 29 | 16 | 27 |
| F | EX | Kyrgyzstan | AS | 30,31 | 17 | 135 |
| F | EY | Tajikistan | AS | 30 | 17 | 262 |

| Notes | Prefix | Entity | Continent | ITU | CQ | ADIF Codes |
|-------|--------------|--------------------------|-----------|--------|--------|------------|
| F | EZ | Turkmenistan | AS | 30 | 17 | 280 |
| F | F | France | EU | 27 | 14 | 227 |
| F | FG | Guadeloupe | NA | 11 | 08 | 79 |
| F,13 | FH | Mayotte | AF | 53 | 39 | 169 |
| F,49 | FJ | Saint Barthelemy | NA | 11 | 08 | 211 |
| F | FK | New Caledonia | OC | 56 | 32 | 162 |
| 45 | FK | Chesterfield Is. | OC | 56 | 30 | 512 |
| F | FM | Martinique | NA | 11 | 08 | 84 |
| F,16 | FO | Austral I. | OC | 63 | 32 | 16 |
| F,16 | FO | Marquesas I. | OC | 63 | 31 | 167 |
| F | FO | Clipperton I. | NA | 10 | 07 | 35 |
| F | FO | French Polynesia | OC | 63 | 32 | 175 |
| F | FP | St. Pierre & Miquelon | NA | 09 | 05 | 253 |
| F,17 | FR/G | Glorioso Is. | AF | 53 | 39 | 99 |
| F,17 | FR/J, E | Juan de Nova, Europa | AF | 53 | 39 | 124 |
| F | FR | Reunion I. | AF | 53 | 39 | 453 |
| F | FR/T | Tromelin I. | AF | 53 | 39 | 276 |
| F,1 | FJ | Saint Martin | NA | 11 | 08 | 211 |
| F | FT/W | Crozet I. | AF | 68 | 39 | 41 |
| F | FT/X | Kerguelen Is. | AF | 68 | 39 | 131 |
| F | FT/Z | Amsterdam & St. Paul Is. | AF | 68 | 39 | 10 |
| F | FW | Wallis & Futuna Is. | OC | 62 | 32 | 298 |
| F | FY | French Guiana | SA | 12 | 09 | 63 |
| F | G, GX, M | England | EU | 27 | 14 | 223 |
| F | GD, GT, MD | Isle of Man | EU | 27 | 14 | 114 |
| F | GI, GN, MI | Northern Ireland | EU | 27 | 14 | 265 |
| F | GJ, GH, MJ | Jersey | EU | 27 | 14 | 122 |
| F | GM, GS, MM | Scotland | EU | 27 | 14 | 279 |
| F | GU, GPm | MU Guernsey | EU | 27 | 14 | 106 |
| F | GW, GC, MW | Wales | EU | 27 | 14 | 294 |
| F | H4 | Solomon Is. | OC | 51 | 28 | 499 |
| F,18 | H40 | Temotu Province | OC | 51 | 32 | 507 |
| F | HA, HG | Hungary | EU | 28 | 15 | 239 |
| F | HB | Switzerland | EU | 28 | 14 | 287 |
| F | HB0 | Liechtenstein | EU | 28 | 14 | 251 |
| F,T | HC-HD | Ecuador | SA | 12 | 10 | 120 |
| F,T | HC8-HD8 | Galapagos Is. | SA | 12 | 10 | 71 |
| T | HH | Haiti | NA | 11 | 08 | 78 |
| F,T | HI | Dominican Republic | NA | 11 | 08 | 72 |
| F,T | HJ-HK, 5J-5K | Colombia | SA | 12 | 09 | 116 |
| F,T | HK0 | Malpelo I. | SA | 12 | 09 | 442 |
| F,T | HK0 | San Andres & Providencia | NA | 11 | 07 | 216 |
| F | HL, 6K-6N | South Korea | AS | 44 | 25 | 235 |
| F,T | HO-HP | Panama | NA | 11 | 07 | 88 |
| F,T | HQ-HR | Honduras | NA | 11 | 07 | 80 |
| F | HS-E2 | Thailand | AS | 49 | 26 | 387 |
| | HV | Vatican | EU | 28 | 15 | 295 |
| F | HZ | Saudi Arabia | AS | 39 | 21 | 378 |
| F | I | Italy | EU | 28 | 15, 33 | 248 |
| F | ISO, IM0 | Sardinia | EU | 28 | 15 | 225 |
| F | J2 | Djibouti | AF | 48 | 37 | 382 |
| F,T | J3 | Grenada | NA | 11 | 08 | 77 |
| | J5 | Guinea-Bissau | AF | 46 | 35 | 109 |
| F,T | J6 | St. Lucia | NA | 11 | 08 | 516 |
| F,T | J7 | Dominica | NA | 11 | 08 | 95 |
| T | J8 | St. Vincent | NA | 11 | 08 | 253 |
| F | JA-JS, 7J-7N | Japan | AS | 45 | 25 | 339 |
| F,19 | JD1 | Minami Torishima | OC | 90 | 27 | 177 |
| F,20 | JD1 | Ogasawara | AS | 45 | 27 | 192 |
| F | JT-JV | Mongolia | AS | 32, 33 | 23 | 363 |
| F | JW | Svalbard | EU | 18 | 40 | 140 |
| F | JX | Jan Mayen | EU | 18 | 40 | 118 |
| F,T | JY | Jordan | AS | 39 | 20 | 342 |

| Notes | Prefix | Entity | Continent | ITU | CQ | ADIF Codes |
|-------|----------------|---------------------------------------|-----------|--------|-------|------------|
| T | K, W, N, AA-AK | United States of America | NA | 6,7,8 | 3,4,5 | 291 |
| F,T | KG4 | Guantanamo Bay | NA | 11 | 08 | 105 |
| T | KH0 | Mariana Is. | OC | 64 | 27 | 166 |
| T | KH1 | Baker & Howland Is. | OC | 61 | 31 | 19 |
| F,T | KH2 | Guam | OC | 64 | 27 | 103 |
| F,T | KH3 | Johnston I. | OC | 61 | 31 | 122 |
| T | KH4 | Midway I. | OC | 61 | 31 | 173 |
| T | KH5 | Palmyra & Jarvis Is. | OC | 61,62 | 31 | 197 |
| T | KH5K | Kingman Reef | OC | 61 | 31 | 134 |
| F,T | KH6, KH7 | Hawaii | OC | 61 | 31 | 110 |
| T | KH7K | Kure I. | OC | 61 | 31 | 134 |
| F,T | KH8 | American Samoa | OC | 62 | 32 | 9 |
| F,T48 | KH8 | Swains I. | OC | 62 | 32 | 259 |
| T | KH9 | Wake I. | OC | 65 | 31 | 301 |
| F,T | KL, AL, NL, WL | Alaska | NA | 1,2 | 1 | 6 |
| T | KP1 | Navassa I. | NA | 11 | 08 | 157 |
| F,T | KP2 | Virgin Is. | NA | 11 | 08 | 293 |
| F,T | KP4, KP3 | Puerto Rico | NA | 11 | 08 | 202 |
| T,22 | KP5 | Desecheo I. | NA | 11 | 08 | 221 |
| F | LA-LN | Norway | EU | 18 | 14 | 266 |
| F,T | LO-LW | Argentina | SA | 14,16 | 13 | 100 |
| F | LX | Luxembourg | EU | 27 | 14 | 254 |
| F | LY | Lithuania | EU | 29 | 15 | 146 |
| F | LZ | Bulgaria | EU | 28 | 20 | 212 |
| F,T | OA-OC | Peru | SA | 12 | 10 | 136 |
| F | OD | Lebanon | AS | 39 | 20 | 354 |
| F,T | OE | Austria | EU | 28 | 15 | 206 |
| F | OF-OI | Finland | EU | 18 | 15 | 224 |
| F | OH0 | Aland Is. | EU | 18 | 15 | 5 |
| F | OJ0 | Market Reef | EU | 18 | 15 | 167 |
| F,23 | OK-OL | Czech Rep. | EU | 28 | 15 | 215 |
| F,23 | OM | Slovak Rep. | EU | 28 | 15 | 255 |
| F | ON-OT | Belgium | EU | 27 | 14 | 209 |
| F | OU-OW, OZ | Denmark | EU | 18 | 14 | 221 |
| F | OX | Greenland | NA | 5, 75 | 40 | 237 |
| F | OY | Faroe Is. | EU | 18 | 14 | 222 |
| 24 | P2 | Papua New Guinea | OC | 51 | 28 | 163 |
| F,25 | P4 | Aruba | SA | 11 | 09 | 91 |
| 26 | P5 | Democratic People's Republic of Korea | AS | 44 | 25 | 344 |
| F | PA-PI | Netherlands | EU | 27 | 14 | 263 |
| F | PJ2, 4, 9 | Bonaire, Curacao | SA | 11 | 09 | 104 |
| F | PJ5-8 | St. Maarten, Saba, St Eustatius | NA | 11 | 08 | 516 |
| F,T | PP-PY | Brazil | SA | (D) | 11 | 108 |
| F,T | PP0-PY0 | Fernando de Noronha | SA | 13 | 11 | 56 |
| F,T | PP0-PY0 | St. Peter & St. Paul Rocks | SA | 13 | 11 | 253 |
| F,T | PP0-PY0 | Trindade & Martin Vaz Is. | SA | 15 | 11 | 271 |
| | PZ | Suriname | SA | 12 | 09 | 140 |
| F | R1FJ | Franz Josef Land | EU | 75 | 40 | 61 |
| F | R1MV | Malyj Vysotskij I | EU | 29 | 16 | 151 |
| 1,27 | S0 | Western Sahara | AF | 46 | 33 | 302 |
| F | S2 | Bangladesh | AS | 41 | 22 | 305 |
| F,6 | S5 | Slovenia | EU | 28 | 15 | 499 |
| | S7 | Seychelles | AF | 53 | 39 | 379 |
| F | S9 | Sao Tome & Principe | AF | 47 | 36 | 219 |
| F | SA-SM | Sweden | EU | 18 | 14 | 284 |
| F | SN-SR | Poland | EU | 28 | 15 | 269 |
| | ST | Sudan | AF | 47, 48 | 34 | 466 |
| | SU | Egypt | AF | 38 | 34 | 478 |
| F,4 | SV-SZ | Greece | EU | 28 | 20 | 236 |

| Notes | Prefix | Entity | Continent | ITU | CQ | ADIF Codes |
|-------|-----------------------|---------------------------------|-----------|-------|--------|------------|
| F | SV/A | Mount Athos | EU | 28 | 20 | 446 |
| F,45 | SV5 | Dodecanese | EU | 28 | 20 | 45 |
| F,49 | SV9 | Crete | EU | 28 | 20 | 40 |
| 28 | T2 | Tuvalu | OC | 65 | 31 | 282 |
| | T30 | W. Kiribati (Gilbert Is.) | OC | 65 | 31 | 301 |
| | T31 | C. Kiribati (Brit. Phoenix Is.) | OC | 62 | 31 | 31 |
| | T32 | E. Kiribati (Line Is.) | OC | 61,63 | 31 | 513 |
| | T33 | Banaba I. (Ocean I.) | OC | 65 | 31 | 21 |
| | T5, 60 | Somalia | AF | 48 | 37 | 232 |
| F | T7 | San Marino | EU | 28 | 15 | 278 |
| 21 | T8 | Palau | OC | 64 | 27 | 22 |
| F | TA-TC | Turkey | EU/AS | 39 | 20 | 390 |
| F | TF | Iceland | EU | 17 | 40 | 242 |
| F,T | TG, TD | Guatemala | NA | 12 | 07 | 76 |
| F,T | TI, TE | Costa Rica | NA | 11 | 07 | 308 |
| F,T | TI9 | Cocos I. | NA | 12 | 07 | 36 |
| | TJ | Cameroon | AF | 47 | 36 | 406 |
| F | TK | Corsica | EU | 28 | 15 | 214 |
| 30 | TL | Central Africa | AF | 47 | 36 | 30 |
| 31 | TN | Congo (Republic of) | AF | 52 | 36 | 39 |
| F,32 | TR | Gabon | AF | 52 | 36 | 420 |
| 33 | TT | Chad | AF | 47 | 36 | 410 |
| F,34 | TU | Côte d'Ivoire | AF | 46 | 35 | 428 |
| 35 | TY | Benin | AF | 46 | 35 | 416 |
| F,36 | TZ | Mali | AF | 46 | 35 | 442 |
| F | UA-UI1, 3, 4, 6 RA-RZ | European Russia | EU | (E) | 16 | 54 |
| F | UA2 | Kaliningrad | EU | 29 | 15 | 126 |
| F | UA-UI8, 9, 0 RA-RZ | Asiatic Russia | AS | (F) | (G) | 15 |
| | UJ-UM | Uzbekistan | AS | 30 | 17 | 292 |
| F | UN-UQ | Kazakhstan | AS | 29-31 | 17 | 130 |
| F | UR-UZ, EM-EO | Ukraine | EU | 29 | 16 | 288 |
| F,T | V2 | Antigua & Barbuda | NA | 11 | 08 | 94 |
| T | V3 | Belize | NA | 11 | 07 | 66 |
| T,37 | V4 | St. Kitts & Nevis | NA | 11 | 08 | 516 |
| F | V5 | Namibia | AF | 57 | 38 | 464 |
| T,38 | V6 | Micronesia (E. Caroline Is.) | OC | 65 | 27 | 173 |
| F,T | V7 | Marshall Is. | OC | 65 | 31 | 168 |
| F | V8 | Brunei Darussalam | OC | 54 | 28 | 345 |
| F,T | VE, VO, VY | Canada | NA | (H) | 1-5 | 1 |
| F,T | VK | Australia | OC | (I) | 29, 30 | 150 |
| F,T | VK0 | Heard I. | AF | 68 | 39 | 110 |
| F,T | VK0 | Macquarie I. | OC | 60 | 30 | 502 |
| F,T | VK9C | Cocos (Keeling) Islands | OC | 54 | 29 | 36 |
| F,T | VK9L | Lord Howe I. | OC | 60 | 30 | 146 |
| F,T | VK9M | Mellish Reef | OC | 56 | 30 | 171 |
| F | VK9N | Norfolk I. | OC | 60 | 32 | 188 |
| F,T | VK9W | Willis I. | OC | 55 | 30 | 302 |
| F,T | VK9X | Christmas I. | OC | 54 | 29 | 318 |
| 37 | VP2E | Anguilla | NA | 11 | 08 | 12 |
| 37 | VP2M | Montserrat | NA | 11 | 08 | 96 |

NOTES

- 1 Unofficial prefix.
- 2 (5T) Only contacts made June 20, 1960, and after, count for this entity.
- 3 (5U) Only contact made August 3, 1960, and after, count for this entity.
- 4 (6W) Only contacts made June 20, 1960, and after, count for this entity.
- 5 (70) Only contacts made May 22, 1990, and after, count for this entity.
- 6 (9A, S5) Only contacts made June 26, 1991, and after, count for this entity.
- 7 (9G) Only contacts made March 5, 1957, and after, count for this entity.
- 8 (9M2, 4, 6, 8) Only contacts made September 16, 1963, and after, count for this entity.

| Notes | Prefix | Entity | Continent | ITU | CQ | ADIF Codes |
|-------|------------------------|------------------------------|-----------|-------|----|------------|
| F,37 | VP2V | British Virgin Is. | NA | 11 | 08 | 65 |
| F | VP5 | Turks & Caicos Is. | NA | 11 | 08 | 89 |
| F,46 | VP6 | Ducie I. | OC | 63 | 32 | 72 |
| F,T | VP6 | Pitcairn I. | OC | 63 | 32 | 375 |
| F | VP8 | Falkland Is. | SA | 16 | 13 | 141 |
| F | VP8, LU | South Georgia I. | SA | 73 | 13 | 232 |
| F | VP8, LU | South Orkney Is. | SA | 73 | 13 | 238 |
| F | VP8, LU | South Sandwich Is. | SA | 73 | 13 | 238 |
| F | VP8, LU, CE9, HF0, 4K1 | South Shetland Is. | SA | 73 | 13 | 240 |
| F | VP9 | Bermuda | NA | 11 | 05 | 64 |
| F | VQ9 | Chagos Is. | AF | 41 | 39 | 33 |
| F | VR | Hong Kong | AS | 44 | 24 | 321 |
| F | VU | India | AS | 41 | 22 | 324 |
| F | VU4 | Andaman & Nicobar Is. | AS | 49 | 26 | 11 |
| F | VU7 | Lakshadweep Is. | AS | 41 | 22 | 135 |
| F,T | XA-XI | Mexico | NA | 10 | 06 | 50 |
| F,T | XA4-XI4 | Revillagigedo | NA | 10 | 06 | 453 |
| F,39 | XT | Burkina Faso | AF | 46 | 35 | 212 |
| | XU | Cambodia | AS | 49 | 26 | 312 |
| | XW | Laos | AS | 49 | 26 | 143 |
| F | XX9 | Macao | AS | 44 | 24 | 152 |
| | XY-XZ | Myanmar | AS | 49 | 26 | 309 |
| | YA | Afghanistan | AS | 40 | 21 | 3 |
| F,40 | YB-YH | Indonesia | OC | 51,54 | 28 | 327 |
| F | YI | Iraq | AS | 39 | 21 | 333 |
| F | YJ | Vanuatu | OC | 56 | 32 | 158 |
| F | YK | Syria | AS | 39 | 20 | 384 |
| F | YL | Latvia | EU | 29 | 15 | 145 |
| F,T | YN, H6-7, HT | Nicaragua | NA | 11 | 07 | 86 |
| F | YO-YR | Romania | EU | 28 | 20 | 275 |
| F,T | YS, HU | El Salvador | NA | 11 | 07 | 74 |
| F | YT-YU | Serbia | EU | 28 | 15 | 296 |
| F,T | YV-YY, 4M | Venezuela | SA | 12 | 09 | 148 |
| F,T | YV0 | Aves I. | NA | 11 | 08 | 206 |
| | Z2 | Zimbabwe | AF | 53 | 38 | 452 |
| F,41 | Z3 | Macedonia (Yugoslav Rep.) | EU | 28 | 15 | 502 |
| F | ZA | Albania | EU | 28 | 15 | 7 |
| F | ZB2 | Gibraltar | EU | 37 | 14 | 233 |
| F,42 | ZC4 | UK Sov. Base areas ON Cyprus | AS | 39 | 20 | 288 |
| F | ZD7 | St. Helena | AF | 66 | 36 | 516 |
| F | ZD8 | Ascension I. | AF | 66 | 36 | 91 |
| | ZD9 | Tristan da Cunha & Gough I. | AF | 66 | 38 | 90 |
| F | ZF | Cayman Is. | NA | 11 | 08 | 409 |
| F | ZK2 | Niue | OC | 62 | 32 | 188 |
| F | ZK3 | Tokelau Is. | OC | 62 | 31 | 270 |
| F | ZL-ZM | New Zealand | OC | 60 | 32 | 170 |
| F | ZL7 | Chatham Is. | OC | 60 | 32 | 34 |
| F | ZL8 | Kermadec Is. | OC | 60 | 32 | 133 |
| F | ZL9 | Auckland & Campbell Is. | OC | 60 | 32 | 16 |
| F,T | ZP | Paraguay | SA | 14 | 11 | 132 |
| F,T | ZR-ZU | South Africa | AF | 57 | 38 | 232 |
| F | ZS8 | Prince Edward & Marion Is. | AF | 57 | 38 | 201 |

- 9 (9U, 9X) Only contacts made July 1, 1962, and after, count for this entity.
- 10 (9V) Contacts made from September 16, 1963 to August 8, 1965, count for West Malaysia.
- 11 (BS7) Only contacts made January 1, 1995, and after, count for this entity.
- 12 (BV9P) Only contacts made January 1, 1994, and after, count for this entity.
- 13 (D6, FH8) Only contacts made July 6, 1975, and after, count for this entity.
- 14 (DA-DR) Only contacts made with DA-DR stations September 17, 1973, and after, and contacts made with Y2-Y9 stations October 3, 1990 and after, count for this entity.
- 15 (E3) Only contacts made November 14, 1962, and before, or May 24, 1991,

and after, count for this entity.

- 16 (FO) Only contacts made after 23:59 UTC, March 31, 1998 count for this entity.
- 17 (FR) Only contacts made June 25, 1960, and after, count for this entity.
- 18 (H40) Only contacts made after 23:59 UTC, March 31, 1998 count for this entity.
- 19 (JD) Formerly Marcus Island.
- 20 (JD) Formerly Bonin and Volcano Islands.
- 21 (KC6) Includes Yap Islands December 31, 1980, and before.
- 22 (KP5, KP4) Only contacts made March 1, 1979, and after, count for this entity.
- 23 (OK-OL, OM) Only contacts made January 1, 1993, and after, count for this entity.
- 24 (P2) Only contacts made September 16, 1975, and after, count for this entity.
- 25 (P4) Only contacts made January 1, 1986, and after, count for this entity.
- 26 (P5) Only contacts made May 14, 1995, and after count for this entity.
- 27 (S0) Contacts with Rio de Oro (Spanish Sahara), EA9, also count for this entity.
- 28 (T2) Only contacts made January 1, 1976, and after, count for this entity.
- 29 (E7) New prefix for Bosnia - Herzegovina effective November 17, 2007. Contacts are valid for this entity effective October 15, 1991.
- 30 (TL) Only contacts made August 13, 1960, and after, count for this entity.
- 31 (TN) Only contacts made August 15, 1960, and after, count for this entity.
- 32 (TR) Only contacts made August 17, 1960, and after, count for this entity.
- 33 (TT) Only contacts made August 11, 1960, and after count for this entity.
- 34 (TU) Only contacts made August 7, 1960, and after, count for this entity.
- 35 (TY) Only contacts made August 1, 1960, and after, count for this entity.
- 36 (TZ) Only contacts made June 20, 1960, and after, count for this entity.
- 37 (V4, VP2) For DXCC credit for contacts made May 31, 1958 and before: "In view of the recent Federation of British Territories in the Caribbean,

and the desire to update the Countries List and bring it into line with the published criteria, the following changes to the ARRL Countries List are herewith announced. These changes will be effective as of June 1, 1958."

From June 1958 QST page 97

- 38 (V6) Includes Yap Islands January 1, 1981, and after.
 - 39 (XT) Only contacts made August 5, 1960, and after, count for this entity.
 - 40 (YB) Only contacts made May 1, 1963, and after, count for this entity.
 - 41 (Z3) Only contacts made September 8, 1991, and after, count for this entity.
 - 42 (ZC4) Only contacts made August 16, 1960, and after, count for this entity.
 - 43 (E4) Only contacts made February 1, 1999, and after, count for this entity.
 - 44 (4W) Only contacts made March 1, 2000, and after, count for this entity.
 - 45 (FK/C) Only contacts made March 23, 2000, and after, count for this entity.
 - 46 (VP6) Only contacts made November 16, 2001, and after, count for this entity.
 - 47 (40) Only contacts made June 28, 2006, and after, count for this entity.
 - 48 (KH8 - Swains I.) Only contacts made July 22, 2006, and after, count for this entity.
 - 49 (FJ - Saint Barthelemy) Only contacts made December 14, 2007, and after, count for this entity.
- "F" indicates current list of entities for which QSLs may be forwarded by the ARRL membership outgoing QSL service.
- "T" indicates entities with which U.S. amateurs may legally handle third-party message traffic.
- "S" Also 3Y, 8J1, AT0, DP0, FT8Y, LU, OR4, R1AN, VK0, VP8, ZL5, ZS1, ZX0, etc. QSL via entity under whose auspices the particular station is operating. The availability of a third-party traffic agreement and a QSL Bureau applies to the entity under whose auspices the particular station is operating.

DELETED ENTITIES

Reproduced courtesy ARRL July 2010

Deleted Entities Total: 58

Credit for any of these entities can be given if the date of contact in question agrees with the date(s) shown in the corresponding footnote. Entities deleted after 23:59 UTC 31 March 1998 will not be included in the Deleted List.

| Notes | Prefix | Entity | Continent | ITU | CQ |
|-------|-----------|--------------------------------|-----------|--------|----|
| 2 | | Blenheim Reef | AF | 41 | 39 |
| 3 | | Geyser Reef | AF | 53 | 39 |
| 4 | | Abu Ai Is. | AS | 39 | 21 |
| 1,5 | 1M | Minerva Reef | OC | 62 | 32 |
| 6 | 4W | Yemen Arab Rep. | AS | 39 | 21 |
| 7 | 7J1 | Okino Tori-shima | AS | 45 | 27 |
| 8 | 8Z4 | Saudi Arabia/Iraq Neut. Zone | AS | 39 | 21 |
| 9 | 8Z5, 9K3 | Kuwait/Saudi Arabia Neut. Zone | AS | 39 | 21 |
| 10 | 9S4 | Saar | EU | 28 | 14 |
| 11 | 9U5 | Ruanda-Urundi | AF | 52 | 36 |
| 1,12 | AC3 | Sikkim | AS | 41 | 22 |
| 1,13 | AC4 | Tibet | AS | 41 | 23 |
| 14 | C9 | Manchuria | AS | 33 | 24 |
| 15 | CN2 | Tangier | AF | 37 | 33 |
| 16 | CR8 | Damao, Diu | AS | 41 | 22 |
| 16 | CR8 | Goa | AS | 41 | 22 |
| 17 | CR8, CR10 | Portuguese Timor | OC | 54 | 28 |
| 18 | DA-DM | Germany | EU | 28 | 14 |
| 19 | DM, Y2-9 | German Dem. Rep. | EU | 28 | 14 |
| 20 | EA9 | Ifni | AF | 37 | 33 |
| 21 | FF | French West Africa | AF | 46 | 35 |
| 22 | FH, FB8 | Comoros | AF | 53 | 39 |
| 23 | FI8 | French Indo-China | AS | 49 | 26 |
| 24 | FN8 | French India | AS | 41 | 22 |
| 25 | FQ8 | Fr. Equatorial Africa | AF | 47, 52 | 36 |

| Notes | Prefix | Entity | Continent | ITU | CQ |
|-------|------------------|-----------------------------|-----------|-----------|----|
| 26 | HKØ | Bajo Nuevo | NA | 11 | 08 |
| 26 | HKØ, KP3, KS4 | Serrana Bank & Roncador Cay | NA | 11 | 07 |
| 27 | I1 | Trieste | EU | 28 | 15 |
| 28 | I5 | Italian Somaliland | AF | 48 | 37 |
| 29 | JZØ | Netherlands N. Guinea | OC | 51 | 28 |
| 30 | KR6, 8, JR6, KA6 | Okinawa (Ryukyu Is.) | AS | 45 | 25 |
| 31 | KS4 | Swan Is. | NA | 11 | 07 |
| 32 | KZ5 | Canal Zone | NA | 11 | 07 |
| 33 | OK-OM | Czechoslovakia | EU | 28 | 15 |
| 34 | P2, VK9 | Papua Territory | OC | 51 | 28 |
| 34 | P2, VK9 | Terr. New Guinea | OC | 51 | 28 |
| 35 | PK1-3 | Java | OC | 54 | 28 |
| 35 | PK4 | Sumatra | OC | 54 | 28 |
| 35 | PK5 | Netherlands Borneo | OC | 54 | 28 |
| 35 | PK6 | Celebe & Molucca Is. | OC | 54 | 28 |
| 36 | STØ | Southern Sudan | AF | 47,48 | 34 |
| 37 | UN1 | Karelo-Finnish Rep. | EU | 19 | 16 |
| 38 | VO | Newfoundland, Labrador | NA | 09 02, 05 | |
| 39 | VQ1, 5H1 | Zanzibar | AF | 53 | 37 |
| 40 | VQ6 | British Somaliland | AF | 48 | 37 |
| 41 | VQ9 | Aldabra | AF | 53 | 39 |
| 41 | VQ9 | Desroches | AF | 53 | 39 |
| 41 | VQ9 | Farquhar | AF | 53 | 39 |

| | | | | | |
|----|------------|-----------------------------|----|----|----|
| 42 | VS2, 9M2 | Malaya | AS | 54 | 28 |
| 42 | VS4 | Sarawak | OC | 54 | 28 |
| 43 | VS9A, P, S | People's Dem. Rep. of Yemen | AS | 39 | 21 |
| 44 | VS9H | Kuria Muria I. | AS | 39 | 21 |
| 45 | VS9K | Kamaran Is. | AS | 39 | 21 |

| | | | | | |
|----|----------|----------------------|----|----|----|
| 42 | ZC5 | British North Borneo | OC | 54 | 28 |
| 46 | ZC6, 4X1 | Palestine | AS | 39 | 20 |
| 47 | ZD4 | Gold Coast, Togoland | AF | 46 | 35 |
| 48 | ZS0, 1 | Penguin Is. | AF | 57 | 38 |
| 49 | ZS9 | Walvis Bay | AF | 57 | 38 |

NOTES

- Unofficial prefix.
- (Blenheim Reef) Only contacts made from May 4, 1967, to June 30, 1975, count for this entity. Contacts made July 1, 1975, and after, count as Chagos (VQ9).
- (Geyser Reef) Only contacts made from May 4, 1967, to February 28, 1978, count for this entity.
- (Abu Ail Is.) Only contacts made March 30, 1991, and before, count for this entity.
- (1M) Only contacts made from July 15, 1972, and before, count for this entity. Contacts made July 16, 1972, and after, count as Tonga (A3).
- (4W) Only contacts made May 21, 1990, and before, count for this entity.
- (7J1) Only contacts made May 30, 1976, to November 30, 1980, count for this entity. Contacts made December 1, 1980, and after, count as Ogasawara (JD1).
- (8Z4) Only contacts made December 25, 1981, and before, count for this entity.
- (8Z5, 9K3) Only contacts made December 14, 1969, and before, count for this entity.
- (9S4) Only contacts made 31 March 1957, and before, count for this entity.
- (9U5) Only contacts made from July 1, 1960, to June 30, 1962, count for this entity. Contacts made July 1, 1962, and after, count as Burundi (9U) or Rwanda (9X).
- (AC3) Only contacts made April 30, 1975, and before, count for this entity. Contacts made May 1, 1975, and after, count as India (VU).
- (AC4) Only contacts made May 30, 1974, and before, count for this entity. Contacts made May 31, 1974 and after, count as China (BY).
- (C9) Only contacts made September

- 15, 1963, and before, count for this entity. Contacts made September 14, 1963, and after, count as China (BY).
- (CN2) Only contacts made June 30, 1960, and before, count for this entity. Contacts made July 1, 1960, and after, count as Morocco (CN).
- (CR8) Only contacts made December 31, 1961, and before, count for this entity.
- (CR8, CR10) Only contacts made September 14, 1976, and before, count for this entity.
- (DA-DM) Only contacts made September 16, 1973, and before, count for this entity. Contacts made September 17, 1973, and after, count as either FRG (DA-DL) or GDR (Y2-Y9).
- (DM, Y2-Y9) Only contacts made from September 17, 1973 and October 2, 1990 count for this entity. On October 3, 1990 the GDR became part of the FRG.
- (EA9) Only contacts made May 13, 1969, and before, count for this entity.
- (FF) Only contacts made August 6, 1960, and before, count for this entity.
- (FH, FB8) Only contacts made July 5, 1975, and before, count for this entity. Contacts made July 6, 1975, and after, count as Comoros (D6) or Mayotte (FH).
- (F18) Only contacts made December 20, 1950, and before, count for this entity.
- (FN8) Only contacts made October 31, 1954, and before count for this entity.
- (FQ8) Only contacts made August 16, 1960, and before, will count for this entity.
- (HK0, KP3, KS4) Only contacts

- made September 16, 1981, and before, count for this entity. Contacts made September 17, 1981, and after, count as San Andres (HK0).
- (11) Only contacts made March 31, 1957, and before, count for this entity. Contacts made April 1, 1957, and after, count as Italy (I).
- (15) Only contacts made June 30, 1960, and before, count for this entity.
- (JZ0) Only contacts made April 30, 1963, and before, count for this entity.
- (KR6, 8, JR6, KA6) Only contacts made May 14, 1972, and before, count for this entity. Contacts made May 15, 1972, and after, count as Japan (JA).
- (KS4) Only contacts made August 31, 1972, and before, count for this entity. Contacts made September 1, 1972, and after, count as Honduras (HR).
- (KZ5) Only contacts made September 30, 1979, and before, count for this entity.
- (OK-OM) Only contacts made December 31, 1992, and before, count for this entity.
- (P2, VK9) Only contacts made September 15, 1975, and before, count for this entity. Contacts made September 16, 1975, and after, count as Papua New Guinea (P2).
- (PK1-6) Only contacts made April 30, 1963, and before, count for this entity. Contacts made May 1, 1963, and after, count as Indonesia.
- (ST0) Only contacts made between May 7, 1972 and December 31, 1994 count for this entity.
- (UN1) Only contacts made June 30, 1960, and before, count for this entity. Contacts made July 1, 1960, and after, count as European

- RSFSR (UA).
- (VO) Only contacts made March 31, 1949, and before, count for this entity. Contacts made April 1, 1949, and after, count as Canada (VE).
- (VQ1, 5H1) Only contacts made May 31, 1974, and before, count for this entity. Contacts made June 1, 1974, and after, count as Tanzania (5H).
- (VQ6) Only contacts made June 30, 1960, and before, count for this entity.
- (VQ9) Only contacts made June 28, 1976, and before, count for this entity. Contacts made June 29, 1976, and after, count as Seychelles (S7).
- (VS2, VS4, ZC5, 9M2) Only contacts made September 15, 1963, and before, count for this entity. Contacts made September 16, 1963, and after, count as West Malaysia (9M2) or East Malaysia (9M6, 8).
- (VS9A, P, S) Only contacts made May 21, 1990, and before, count for this entity.
- (VS9H) Only contacts made November 29, 1967, and before, count for this entity.
- (VS9K) Only contacts made on March 10, 1982, and before, count for this entity.
- (ZC6, 4X1) Only contacts made June 30, 1968, and before, count for this entity. Contacts made July 1, 1968, and after, count as Israel (4X).
- (ZD4) Only contacts made March 5, 1957, and before, count for this entity.
- (ZS0, 1) Only contacts made February 28, 1994, and before, count for this entity.
- (ZS9) Only contacts made from September 1, 1977, to February 28, 1994, count for this entity.

PREFIX CROSS REFERENCES

Reproduced courtesy ARRL, revised June 2008

Continent

AF = Africa
AN = Antarctica
AS = Asia
EU = Europe
NA = North America
OC = Oceania
SA = South America

Zone Notes

(A) 33, 42, 43, 44
(B) 67, 69-74
(C) 12, 13, 29, 30, 32, 38, 39
(D) 12, 13, 15
(E) 19, 20, 29, 30
(F) 20-26, 30-35, 75

(G) 16, 17, 18, 19, 23
(H) 2, 3, 4, 9, 75
(I) 55, 58, 59

A8 = EL
AC (before 1972) = A5
AH = KH
AL7 = KL7
AM-AO = EA
AT-AW = VU
AX = VK
AY-AZ = LU
CF-CK = VE
CL = CO
CQ-CS = CT
CR3 (before 1974) = J5

CR4 (before 1976) = D4
CR5 (before 1976) = S9
CR6 (before 1976) = D2
CR7 (before 1976) = C9
CR9 (before 1985) = XX9
CT2 (before 1986) = CU
CX0 = CE9/VP8
CY-CZ = VE
CY0 (before 1985) = CY9
D7 = HL
DM-DT (before 1980) = Y2-9
DS-DT = HL
E2 = HS
EA0 (before 1969) = 3C
EK, EM-EO, ER-ES, EU-EZ = U
ER (after 1992) = UO

EU (after 1991) = UC
FA-FF (after 1983) = F
FA (before 1963) = 7X
FB8 (before 1961) = 5R
FB8 (before 1985) = FT
FC (before 1985) = TK
FD8 (before 1961) = 5V
FE8 (before 1961) = TJ
FL (before 1978) = J2
FU8 (before 1982) = YJ
GB = G
GC (before 1977) = GJ or GU
H2 = 5B
H3 = HP
H5 (Bophutatswana) = ZS
H7 = YN

| | | | |
|--------------------------------|----------------------------|----------------------------|-----------------------------|
| HE = HB | T4 = CO | VR2 (after 1991) = VS6 | 2J = GJ |
| HM (before 1982) = HL | T4 (Venda) = ZS | VR3 (before 1980) = T32 | 2M = GM |
| HT = YN | T9 = E7 | VR4 (before 1979) = H4 | 2U = GU |
| HU = YS | TH, TM, TO-TQ, TV-TX = F | VR5 (before 1971) = A3 | 2W = GW |
| HW-HY = F | UB (before 1994) = UZ | VR6 (before 1998) = VP6 | 3B-3C (before 1968) = VE |
| J4 = SV | UC (before 1991) = EU | VR8 (before 1979) = T2 | 3D6 (before 1988) = 3DA |
| KA1 = JD1 | UD (before 1994) = 4J | VS1 (before 1966) = 9V | 3G = CE |
| KA2AA-KA9ZZ = JA | UF (before 1994) = 4L | VS5 (before 1985) = V8 | 3Z = SP |
| KB6 (before 1979) = KH1 | UG (before 1994) = EK | VS6 (before 1997) = VR | 4A-4C = XE |
| KC4 (Navassa) = KP1 | UH (before 1993) = EZ | VS7 (before 1949) = 4S | 4D-4I = DU |
| KC6 (before 1990) = V6 | UI (before 1994) = UJ | VS9M = 8Q | 4J-4L = U |
| KC6 (before 1998) = T8 | UJ (before 1993) = EY | VS9O (before 1961) = A4 | 4J (after 1991) = EK |
| KG6 (before 1979) = KH2 | UL (before 1994) = UN | VX-VY = CY0/VE | 4J1F (before 1994) = R1MV |
| KG6I (before 1970) = JD1 | UM (before 1993) = EX | WH = KH | 4K (before 1994) = UA |
| KG6R, S, T (before 1979) = KH0 | UO (before 1994) = ER | WL7 = KL7 | 4K1 (before 1994) = CE9/KC4 |
| KH7 (before 1996) = KH7K | UP (before 1991) = LY | WP = KP | 4K2 (before 1994) = R1FJ |
| KJ6 (before 1979) = KH3 | UQ (before 1992) = YL | XJ-XO = VE | 4K3 (before 1994) = UA |
| KM6 (before 1979) = KH4 | UR (before 1991) = ES | XP = OX | 4K4 (before 1994) = UA0 |
| KP4 (Desecheo) = KP5 | V9 (Venda) = ZS | XQ-XR = CE | 4L (after 1991) = UF |
| KP6 (before 1979) = KH5 | VA-VG = VE | XS = BY | 4M = YV |
| KS6 (before 1979) = KH8 | VH-VN = VK | XV = 3W | 4N-4O = YU |
| KV4 (before 1979) = KP2 | VK9 (Nauru) = C2 | XX7 (before 1976) = C9 | 4T = OA |
| KW6 (before 1979) = KH9 | VP1 (before 1982) = V3 | YU2 (before 1992) = 9A | 4U1VIC = OE |
| KX6 (before 1990) = V7 | VP2A (before 1982) = V2 | YU3 (before 1992) = S5 | 4V = HH |
| L2-9 = LU | VP2D (before 1979) = J7 | YU4 (before 1992) = T9 | 5J-5K = HK |
| M = G | VP2G (before 1975) = J3 | YU5 (before 1992) = Z3 | 5L-5M = EL |
| M1 (before 1984) = T7 | VP2K (before 1984) = V4 or | ZB1 (before 1965) = 9H | 6C = YK |
| MP4B (before 1972) = A9 | VP2E | ZD1 (before 1962) = 9L | 6D-6J = XE |
| MP4M (before 1972) = A4 | VP2L (before 1980) = J6 | ZD2 (before 1961) = 5N | 6K-6N = HL |
| MP4Q (before 1972) = A7 | VP2S (before 1980) = J8 | ZD3 (before 1966) = C5 | 6O = T5 |
| MP4T, D (before 1972) = A6 | VP3 (before 1967) = 8R | ZD5 (before 1969) = 3DA | 6T-6U = ST |
| NH = KH | VP4 (before 1963) = 9Y | ZD6 (before 1965) = 7Q | 7A-7I = YB |
| NL7 = KL7 | VP5 (Jamaica) = 6Y | ZE (before 1981) = Z2-9 | 7G (before 1967) = 3X |
| NP = KP | VP5E = VP2E | ZK1 (after June 2006) = E5 | 7J-7N = JA |
| OQ (before 1961) = 9Q | VP6 (before 1967) = 8P | ZK9 (1983) = ZK2 | 7J1 = JA1 or JD1 |
| P3 = 5B | VP7 (before 1974) = C6 | ZM6 (before 1963) = 5W | 7S = SM |
| P4 (before 1986) = PJ | VQ2 (before 1965) = 9J | ZM7 (before 1984) = ZK3 | 7Z = HZ |
| PX (before 1970) = C3 | VQ3 (before 1962) = 5H | ZS3 (before 1991) = V5 | 8A-8I = YB |
| RA, RN = UA | VQ4 (before 1964) = 5Z | ZS7 (before 1969) = 3D6 | 8J-8N = JA |
| RB-RR = UB-UR | VQ5 (before 1963) = 5X | ZS8 (before 1967) = 7P | 8O = A2 |
| RS = U | VQ8 (before 1969) = 3B | ZS9 (before 1967) = A2 | 8S = SM |
| RT = UB | VQ8 (Chagos) = VQ9 | ZV-ZZ = PY | 9A (before 1984) = T7 |
| RU-RX = U | VQ9 (Seychelles) = S7 | 2D = GD | 9B-9D = EP |
| S4 (Ciskei) = ZS | VR1 (before 1980) = T3 | 2E = G | 9E-9F = ET |
| S8 (Transkei) = ZS | VR2 (before 1971) = 3D2 | 2I = GI | |

AMATEUR SATELLITES

by
ANDREW BARRON
ZL3DW

Satellite operation is a fascinating and challenging aspect of amateur radio. There are a variety of modes both digital and analog that can be used and a choice of satellites to communicate through. Equipment required for satellite operation can range from a dual band hand held transceiver with a hand held Yagi antenna, up to sophisticated ground stations with computer-controlled transceivers and antenna systems.

The amateur satellite service is recognised by the ITU. There are frequency allocations within the amateur bands for satellite operation, [see the New Zealand Amateur Radio Bandplans]. The first amateur radio satellite, was OSCAR 1 launched on the 12th December 1961 by a Thor Agena B rocket from Vandenberg Air Force Base, California. Coincidentally the date was also significant because it was the 60th anniversary of the first radio

transmission across the Atlantic Ocean by Guglielmo Marconi. It is impressive that amateur radio hams were able to build a successful satellite only four years after Sputnik 1, the first ever man made satellite, which was launched on the 4th October 1957.

OSCAR 1 was the first non-governmental satellite ever launched. It transmitted "HI" in Morse code with 140 milliwatts of power on a frequency of 144.983 MHz. As a scientific experiment, the speed of the cw message was used to indicate the temperature inside the satellite.

Since 1961 there have been more than 120 satellites launched carrying transponders or beacons on amateur radio frequencies. Many of these are small 'cubesats' built by Universities or other interest groups. While these often use amateur radio frequencies for control and telemetry they are of less interest than the satellites

built by ham radio enthusiasts which carry transponders for use by ham radio operators, world wide. To differentiate between these two classes of satellites, I refer to the satellites built by Universities etc. as "amateur satellites" and the satellites built by radio hams as "amateur radio satellites" or 'HAMSATS'. There are currently 10 HAMSATS in orbit with active analog transponders and 38 with digital transponders or beacons.

Most amateur radio satellites (HAMSATS) are awarded an OSCAR number as soon as the satellite is in orbit and operational. OSCAR stands for Orbital Satellite Carrying Amateur Radio. So far there have been 68 OSCAR satellites, originating from 23 countries. OSCAR numbers are issued sequentially and the designation usually gives a clue as to the origin of the satellite. For example AO-7 is from AMSAT North America,

FO-29 is Fuji OSCAR from Japan, SO-50 is from Saudi Arabia, VO-52 is from India, and UO-11 is from University of Surrey. As well as the OSCAR satellites, there was a series of 18 Russian built amateur radio satellites, which were known as Radiosputnik or "RS" satellites. Many of the RS satellites were amateur radio transponders physically attached to commercial communications satellites and were not issued with OSCAR numbers. RS-30 named "Yubileiny", Russian for jubilee was launched on May 23, 2008. The satellite celebrates the 50th anniversary of 'Sputnik' the first man made space satellite. Amateur radio has also been an important part of manned space exploration. The Russian MIR spacecraft (1986-2001) carried ham radio and SSTV equipment. Between 1983 and 1999, ham radio licensed astronauts participated in the SAREX programme during 28 space shuttle flights. They

carried out 1000s of QSOs with hams on Earth and made the first space to space ham QSOs to chat to other hams aboard the MIR space station.

Currently the International Space Station (ISS) carries ARISS -amateur radio aboard ISS, which is used for educational conversations with school children around the world, QSOs between hams and the space station crew, an FM repeater, SSTV (slow scan television) pictures, packet radio and APRS (amateur radio positioning system). So if you are lucky you could chat to an Astronaut on the space station.

Probably the most unique HAMSAT so far is 'SuitSat', a redundant Russian Orlan spacesuit fitted with a radio transmitter, some instrumentation, and padded out with unwanted laundry. The 'Expedition 12' crew launched SuitSat from the international space station on February 3rd 2006. AMSAT designated SuitSat as AMSAT OSCAR 54 (AO-54). The satellite transmitted a digital recording of the voices of school children on 145.990 MHz. Unfortunately the signal was much weaker than expected, probably due to a broken antenna. SuitSat was last heard on the 18th of February 2006 and has now burned up in the Earth's atmosphere. There are plans for more satellites to be launched by hand from the ISS and the first, 'ARRISSAT' is due to be launched in 2010.

Amateur satellites can be grouped according to their orbit. High Earth Orbit (HEO) satellites usually have large elliptical (Molniya) orbits. For example AO-40 has an apogee (farthest point from Earth) of 58,776km and a perigee (nearest point to Earth) of 1044km. The "footprint" or coverage area of HEO satellites is almost a complete hemisphere of the Earth, a ZL station could expect to work stations in all of Europe, Asia, the Americas and parts of Africa. Unfortunately neither of the two most successful HEO HAMSATS are still in operation. In January 2004, after three successful years in orbit, AO-40 suffered failure of all transponders due to failure of the main battery.

Low Earth Orbit (LEO) satellites have smaller elliptical or near circular orbits typically with a perigee of around 680km - 800km and an apogee of 800-1320km. Since the LEO satellites are closer to Earth, the coverage area or "foot print" is much smaller than the foot print of HEO satellites. A ham in New Zealand can expect to be able to work all of New Zealand and Australia through

the LEO OSCAR satellites. The ISS has a nearly circular orbit 333 perigee-348km apogee.

There are many exciting HAMSAT projects in progress around the world. In Germany a team is working on P3E "Express" a high orbit satellite which will carry a whole range of transponders plus a camera and other experiments.

The local New Zealand AMSAT group is working on KiwiSAT a micro satellite which will carry amateur radio FM and linear transponders and a scientific experiment in Small Satellite Attitude Control.

Modes and Bands

The amateur satellites of most interest to the ham radio community are those which carry transponders for relaying signals back to Earth. Some satellites carry linear transponders, which allow multiple users and transmission types, including SSB, CW, FM, SSTV, and PSK. Some have FM voice transponders which work like cross band repeaters and some satellites carry digital transponders, which receive, regenerate and then re-transmit digital data. Digital transponders are usually used for packet bulletin board systems (BBS), digipeaters and APRS.

Most satellite operation uses the satellite portions of the 2m and 70cm bands. Currently only AO-51 "Echo" has the capability to operate on L band (1268MHz) and S band (2401MHz). The P3E "Express" satellite is proposed to have transponders on bands ranging from 29MHz to 47GHz. Satellite transponders are often referred to by 'mode' rather than referring to the type of transmission SSB, FM etc. The mode relates to the frequency bands used by the satellite transponder. VU mode means that the satellite uplink is on VHF band (2m) and downlink is on UHF (70cm). Conversely UV mode means that the satellite uplink is on UHF band (70cm) and downlink is on VHF (2m). LS mode has a 1268MHz uplink and a 2401MHz downlink. Some linear transponders are "reverse tracking" so that as the uplink frequency increases, the downlink frequency decreases. Generally this type of transponder is also "inverted", the transponder reverses the sidebands so that LSB input to the satellite becomes USB on the downlink.

Equipment requirements for working HAMSATS

The minimum requirement for ground station transceivers is a dual band FM handheld, but for

serious satellite work a multi-mode transceiver capable of full duplex crossband operation (2m/70cm), such as the Yaesu FT-847, Icom IC-910H or Kenwood TS2000 is desirable. Other multi-mode transceivers such as the IC-9100, FT-857 and FT-897 that can be controlled via PC software are also very suitable. Alternatively the station can consist of separate FM or multi mode transceivers for 2m and 70cm. Some satellites have a 'mode A' downlink, which requires a 10m HF receiver. L band operation can be achieved with a transmit converter, or some transceivers have optional built in L band modules. S band operation is usually achieved using an S band to 2m, or S band to 70cm down-converter mounted at the antenna.

For working LEO satellites Yagi antennas with 5 to 10 elements on 2m and 12 elements on 70cm are quite acceptable. It is best if these can be pointed at the satellite using a PC controlled azimuth and elevation rotator, but many operators track the satellites manually. A popular starting point is the 'Arrow' antenna, a simple hand held Yagi made with wire elements mounted on a broom handle. These can be made for a few dollars and designs are available on the Internet. Almost any antenna capable of working on 70cm and 2m will get you started on the FM satellites when they are at high elevations. There is a significant advantage in using circular polarised antennas for satellite work. Circular polarised antennas minimise the effects of cross polarisation fading caused by the satellites' changing position, possible spin modulation (fading due to satellite rotation), and on HEO satellites a small amount of Faraday rotation. The convention is to use antennas made with right hand circular polarisation (rhcp).

For HEO satellite operation, high gain circular polarised (rhcp) antennas such as crossed Yagis, loop Yagis, or helix antennas are required. For L band (23cm), helix, or parabolic dish antennas are usually used. For S band (13cm) operation parabolic dish antennas fed with small helix or circular polarised patch feeds are normal, although long helix antennas are sometimes used.

Satellite tracking

To work stations through the HAMSATS, you need to know when the satellite will be above the horizon and where to point your antenna(s). Most satellite operators use one of the many satellite tracking programs available on the Internet. Programs include Instant Track,

Wisp, Orbitron, Nova, Winorbit, Satscape and SatPC32. The current favourite is SatPC32, which offers rig control with automatic Doppler correction, rotator control, tracking of multiple satellites, display of the ground track and satellite coverage footprint. If you have not installed tracking software, you can get a display of the next 10 passes for many amateur satellites by using the 'Passes' tool on the AMSAT NA web site. Three things are critical for accurate satellite tracking. Firstly the tracking program will need your QTH location, (latitude and longitude). Some software can calculate your location from your Maidenhead grid square. Secondly the program will need up to date Kepler data, which can be downloaded from AMSAT, Celestrak or other web sites. The Kepler data describes the orbit of the satellites. Finally the clock on your PC needs to be accurate. A two-minute error on your PC clock could result in your antenna pointing 36 degrees away from the true position of the satellite and of course the Doppler adjustment would also be way out. Freeware utilities such as Dimension 4 can reset your PC clock very accurately. Kepler data should be updated at least monthly.

Satellite Glossary

OSCAR - Orbital Satellite Carrying Amateur Radio

AOS-acquisition of signal. Time the satellite appears above the horizon.

LOS-loss of signal. Time the satellite sets below the horizon.

Uplink - the signal you send to the satellite.

Downlink - the signal you receive from the satellite.

Mode - frequency band of uplink and downlink (UV, VU, LS, VA).

Pass - the time the satellite is above the horizon and can be used.

Passband - frequency bandwidth of a transponder (FO-29 has a 100kHz passband).

Beacon - most satellites have a cw or telemetry beacon transmitter on a fixed frequency, some have several.

Linear transponder - a wide band linear repeater. It accepts a range of frequencies on the input and retransmits the entire range on the output.

Repeater - a single frequency transponder, just like a standard FM repeater except it works cross band. All satellite repeaters and transponders are full duplex, meaning you can and should listen to your signal on the downlink while you are transmitting.

Digipeater - a transponder

which receives then regenerates a digital signal and retransmits it on the same or another frequency. As opposed to a repeater which does not regenerate the digital signal.

Pilot tone – some FM satellites need a tone, usually 67.0Hz on your transmission to open the satellite receiver squelch. This is similar to the tones required for many terrestrial repeaters. Most modern rigs can generate these DCS tones. For example SO-50 needs 74.4Hz for a few seconds to turn on a 10 minute timer, then 67.0Hz on each transmission.

Inverted – The satellite receives on LSB and transmits on USB. Generally inverted transponders are also “reverse tracking”.

Reverse tracking – The downlink frequency increases as the uplink frequency decreases. Generally reverse tracking transponders are also “inverted”.

Kepler data – Reference Kepler data downloaded as a text file. Kepler data describes the orbit of the satellite so that the tracking software can calculate the time that the satellite will be available at your location and the position of the satellite.

Doppler – frequency shift of both the uplink and downlink signals caused by the speed of the satellite relative to your position. Doppler shift is greater on higher frequencies.

Analog satellite – satellite transponder for voice or cw, (or audio based digital transmissions like SSTV and PSK).

Digital satellite – satellite transponder for digital modes, often AX25 FSK, used for APRS, packet bulletin boards, digipeaters or packet store & forward.

ISS – International Space Station.

ARISS – Amateur Radio aboard the International Space Station

Perigee – satellite orbit closest point to Earth.

Apogee – satellite orbit farthest point from Earth

Footprint – area on the Earth's surface covered by a satellite's antennas. Higher satellites have bigger footprints.

Spin modulation – fluttering

or fading caused by the satellite spinning or tumbling.

Attitude – angle of the satellite with respect to Earth.

Squint – angle of satellite's antennas with respect to your location. (If the satellite's antennas point straight down they are not pointing directly at your QTH).

Some of the Currently Operational Amateur Radio Satellites

For operating information see the AMSAT (NA) web site, the KD5QGR web site and the weekly satellite summary at; rec.radio.amateur.space

AO-7 AMSAT OSCAR 7

AO-7 was launched November 15 1974, it is the oldest HAMSAT in orbit and is still operating after an amazing 36 years in space. AO-7s batteries are dead, but the satellite transponders still work, powered by the solar panels, while the satellite is in sunlight. Uplink power must be kept to an absolute minimum otherwise the current drain exceeds the power that can be supplied by the solar array and the satellite suffers from FM distortion on the downlink transmitter. As AO-7 resets each time it comes into sunlight, it can come up in either mode A, (VA) or mode B (UV) randomly each pass. There is also a timer which toggles the transponder mode part way through some orbits. Recently AO-7 seems to be favouring mode B. Check out the AO-7 log and resource web site and for the benefit of others please fill in the log even if you only heard the beacon or your own downlink.

SO-50 SaudiSat-1c

SO-50 is an FM repeater in space. It has a mode V/U FM voice repeater with an uplink on 145.850 MHz and downlink on 436.795 MHz. SO-50 requires a user to send a short transmission with a ‘pilot’ tone of 74.4Hz to set a 10 minute timer. After that each transmission requires a pilot tone of 67.0Hz to open the receiver squelch on the satellite. SO-50 can be tricky to wake up, but

when active is very sensitive. At high elevations it can be operated with a handheld dual band transceiver.

AO-51 Echo

AO-51 has the most transponders of any of the currently active satellites. It operates simultaneous digital and analog transponders usually in VU mode. For a few days each month other modes such as AU, VS, LU or LS may be operating. The normal analog transponder is an FM mode VU voice repeater. The packet BBS and APRS broadcast transponder uses callsigns Broadcast: PECHO-11 and BBS: PECHO-12. For an up to date schedule check the AO-51 web site.

VO-52 Hamsat

VO-52 has two UV mode linear transponders but only one is active at any given time. If the cw beacon on 145.860MHz is active the Dutch made transponder is operational, if the unmodulated beacon on 145.936MHz is active, the Indian transponder is operational. Both transponders have the same 60kHz bandwidth and similar downlink power. VO-52 has a reverse tracking, inverting transponder.

ARISS Amateur Radio aboard the International Space Station ISS carries an FM 2m mobile for use by the crew for educational and amateur radio use. Mode VV uplink for region 3 is 144.490 MHz and downlink for all modes is 145.800MHz. Crew contacts are dependant on the spare time available to the space station crew. When the transceiver is not in use by the crew it is often setup as a 1200bps AFSK digital transponder, with an uplink of 145.990MHz and downlink of 145.800MHz. ARISS is often used to relay APRS beacons and also carries a packet BBS. Occasionally the ARISS station has been transmitting SSTV pictures on a downlink frequency of 144.4900 MHz. A second transceiver is scheduled to be installed in a different ISS module late 2010.

TV and weather satellites. Many

hams receive signals from geostationary broadcast TV satellites. This can include foreign language broadcasts and direct feeds intended for television stations. Satellite weather images can be received using an HF receiver and decoding software downloaded from the Internet.

Web pages

AMSAT NA main page

<http://www.amsat.org>

AMSAT satellite status

<http://www.amsat.org/amsat-new/satellites/status.php>

Amateur radio satellite history

<http://www.spacetoday.org/Satellites/HAMSATS/>

[HAMSATS Basics.html](http://www.spacetoday.org/Satellites/HAMSATS/HAMSATS_Basics.html)

<http://www.amsat.org/amsat/sats/n7hpr/history.html>

OSCAR 7 Log and resource page

<http://www.planetemily.com/ao7/main.php>

Kepler data and related tutorials & information

<http://celestrak.com>

General interest satellite site and Kepler information

http://www.mindspring.com/~n2wud/html/amsat_keps.html

Dimension 4—reset PC clock to atomic standard

<http://www.thinkman.com/dimension4>

SatPC32 home page

<http://www.dk1tb.de/indexeng.htm>

Satellite operation is initially challenging but is very interesting. It is easy to work hams all over Australia and New Zealand. Everyone is keen to help out new comers so give it a try and make it known that you don't have much satellite experience. There is a regular ‘Satellite orbits’ column in Break-in and news of local activities is always most welcome. For more information on amateur satellites check out the Internet web links listed above. A series of introductory articles on satellite operation is available from the author, zl3dw@nzart.org.nz.

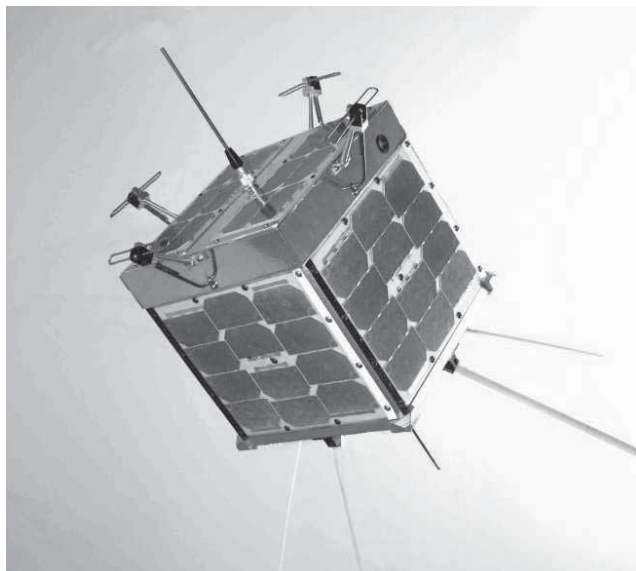


SATELLITE OPERATING FREQUENCIES

| Frequency | OSCAR | Satellite | Service | Mode | Status |
|-------------------|-------|--------------------|-----------------------------|--------|------------------|
| 29.502 | AO-07 | AMSAT-OSCAR 7 | TLM Beacon Downlink | CW | Semi-Operational |
| 145.978 | AO-07 | AMSAT-OSCAR 7 | TLM Beacon Downlink | CW | Semi-Operational |
| 435.100 | AO-07 | AMSAT-OSCAR 7 | Beacon Downlink | FM | Semi-Operational |
| 145.850 - 145.950 | AO-07 | AMSAT-OSCAR 7 | Linear Transponder Uplink | SSB/CW | Semi-Operational |
| 145.975 - 145.925 | AO-07 | AMSAT-OSCAR 7 | Linear Transponder Downlink | SSB/CW | Semi-Operational |
| 29.400 - 29.500 | AO-07 | AMSAT-OSCAR 7 | Linear Transponder Downlink | SSB/CW | Semi-Operational |
| 432.125 - 432.175 | AO-07 | AMSAT-OSCAR 7 | Linear Transponder Uplink | SSB/CW | Semi-Operational |
| 145.920 | AO-16 | AMSAT OSCAR 16 | FM Voice Repeater Uplink | FM | Semi-Operational |
| 437.026 | AO-16 | AMSAT OSCAR 16 | FM Voice Repeater Downlink | FM | Semi-Operational |
| 145.850 | AO-27 | AMRAD-OSCAR 27 | FM Voice Repeater Uplink | FM | Operational |
| 436.795 | AO-27 | AMRAD-OSCAR 27 | FM Voice Repeater Downlink | FM | Operational |
| 145.880 | AO-51 | AMSAT-OSCAR 51 | FM Voice Repeater Uplink | FM | Operational |
| 145.880 | AO-51 | AMSAT-OSCAR 51 | FM Voice Repeater Uplink | FM | Operational |
| 145.920 | AO-51 | AMSAT-OSCAR 51 | FM Voice Repeater Uplink | FM | Operational |
| 435.150 | AO-51 | AMSAT-OSCAR 51 | FM Voice Repeater Downlink | FM | Operational |
| 435.150 | AO-51 | AMSAT-OSCAR 51 | PacSat BBS Downlink | AFSK | Operational |
| 435.300 | AO-51 | AMSAT-OSCAR 51 | FM Voice Repeater Downlink | FM | Operational |
| 435.300 | AO-51 | AMSAT-OSCAR 51 | FM Voice Repeater Downlink | FM | Operational |
| 1268.700 | AO-51 | AMSAT-OSCAR 51 | FM Voice Repeater Uplink | FM | Operational |
| 1268.700 | AO-51 | AMSAT-OSCAR 51 | FM Voice Repeater Uplink | FM | Operational |
| 1268.700 | AO-51 | AMSAT-OSCAR 51 | PacSat BBS Uplink | AFSK | Operational |
| 2401.200 | AO-51 | AMSAT-OSCAR 51 | FM Voice Repeater Downlink | FM | Operational |
| 2401.200 | AO-51 | AMSAT-OSCAR 51 | FM Voice Repeater Downlink | FM | Operational |
| 144.490 | ARISS | ARISS | Crew Contact Uplink | FM | Operational |
| 145.200 | ARISS | ARISS | Crew Contact Uplink | FM | Operational |
| 145.800 | ARISS | ARISS | APRS Uplink | FM | Operational |
| 145.800 | ARISS | ARISS | Crew Contact Downlink | FM | Operational |
| 145.800 | ARISS | ARISS | Crew Contact Downlink | FM | Operational |
| 145.800 | ARISS | ARISS | FM Voice Repeater Downlink | FM | Operational |
| 145.800 | ARISS | ARISS | FM Voice Repeater Uplink | FM | Operational |
| 145.800 | ARISS | ARISS | Imaging Downlink | FM | Operational |
| 145.800 | ARISS | ARISS | Packet Downlink | AFSK | Operational |
| 145.990 | ARISS | ARISS | Packet Uplink | AFSK | Operational |
| 437.800 | ARISS | ARISS | FM Voice Repeater Downlink | FM | Operational |
| 437.800 | ARISS | ARISS | FM Voice Repeater Uplink | FM | Operational |
| 436.838 | CO-55 | CubeSat-OSCAR 55 | TLM Beacon Downlink | FM | Operational |
| 437.400 | CO-55 | CubeSat-OSCAR 55 | Telemetry Downlink | FM | Operational |
| 436.848 | CO-57 | CubeSat-OSCAR 57 | Beacon Downlink | FM | Operational |
| 437.490 | CO-57 | CubeSat-OSCAR 57 | Telemetry Downlink | FM | Operational |
| 437.345 | CO-58 | CubeSat-OSCAR 58 | Telemetry Downlink | FM | Operational |
| 437.465 | CO-58 | CubeSat-OSCAR 58 | Beacon Downlink | FM | Operational |
| 437.275 | CO-65 | Cubesat Oscar-65 | TLM Beacon Downlink | FM | Operational |
| 437.475 | CO-65 | Cubesat Oscar-65 | Digital Downlink | GMSK | Unknown |
| 437.475 | CO-65 | Cubesat Oscar-65 | TLM Beacon Downlink | AX.25 | Operational |
| 1267.600 | CO-65 | Cubesat Oscar-65 | Digital Uplink | GMSK | Unknown |
| 437.485 | CO-66 | Cubesat Oscar - 66 | Digitalker Downlink | FM | Operational |
| 437.485 | CO-66 | Cubesat Oscar - 66 | Other Downlink | FM | Operational |
| 437.485 | CO-66 | Cubesat Oscar - 66 | TLM Beacon Downlink | FM | Operational |
| 437.485 | CO-66 | Cubesat Oscar - 66 | TLM Beacon Downlink | FM | Operational |
| 145.870 | DO-64 | Delfi OSCAR-64 | Telemetry Downlink | FM | Operational |
| 145.930 | DO-64 | Delfi OSCAR-64 | Telemetry Downlink | FM | Operational |
| 435.795 | FO-29 | Fuji-OSCAR 29 | Beacon Downlink | FM | Semi-Operational |
| 435.910 | FO-29 | Fuji-OSCAR 29 | Digitalker Downlink | FM | Unknown |
| 145.900 - 146.000 | FO-29 | Fuji-OSCAR 29 | Linear Transponder Uplink | SSB/CW | Operational |

| Frequency | OSCAR | Satellite | Service | Mode | Status |
|-------------------|-------|----------------------|-----------------------------|---------|------------------|
| 435.800 - 435.900 | FO-29 | Fuji-OSCAR 29 | Linear Transponder Downlink | SSB/CW | Operational |
| 145.890 | GO-32 | Gurwin OSCAR-32 | PacSat BBS Uplink | FSK | Semi-Operational |
| 435.225 | GO-32 | Gurwin OSCAR-32 | PacSat BBS Downlink | FSK | Semi-Operational |
| 435.325 | GO-32 | Gurwin OSCAR-32 | TLM Beacon Downlink | FM | Semi-Operational |
| 145.825 | HO-68 | Hope Oscar 68 (XW-1) | FM Voice Repeater Uplink | FM | Operational |
| 145.825 | HO-68 | Hope Oscar 68 (XW-1) | PacSat BBS Uplink | AFSK | Operational |
| 435.675 | HO-68 | Hope Oscar 68 (XW-1) | FM Voice Repeater Downlink | FM | Operational |
| 435.675 | HO-68 | Hope Oscar 68 (XW-1) | PacSat BBS Downlink | AFSK | Operational |
| 435.790 | HO-68 | Hope Oscar 68 (XW-1) | Beacon Downlink | FM | Operational |
| 145.925 - 145.975 | HO-68 | Hope Oscar 68 (XW-1) | Linear Transponder Uplink | SSB/CW | Operational |
| 435.765 - 435.715 | HO-68 | Hope Oscar 68 (XW-1) | Linear Transponder Downlink | SSB/CW | Operational |
| 437.125 | LO-19 | LUSAT-OSCAR 19 | TLM Beacon Downlink | FM | Operational |
| 145.850 | MO-46 | Malaysian-OSCAR 46 | Packet Uplink | FSK | Unknown |
| 145.925 | MO-46 | Malaysian-OSCAR 46 | Packet Uplink | FSK | Unknown |
| 437.325 | MO-46 | Malaysian-OSCAR 46 | Packet Downlink | FSK | Unknown |
| 437.325 | MO-46 | Malaysian-OSCAR 46 | Packet Downlink | FSK | Unknown |
| 145.827 | NO-44 | Navy-OSCAR 44 | APRS Uplink | AFSK | Semi-Operational |
| 29.353 | RS-15 | Radio-Sputnik 15 | Beacon Downlink | CW | Semi-Operational |
| 29.399 | RS-15 | Radio-Sputnik 15 | Beacon Downlink | CW | Semi-Operational |
| 145.858 - 145.898 | RS-15 | Radio-Sputnik 15 | Linear Transponder Uplink | SSB/CW | Semi-Operational |
| 29.354 - 29.394 | RS-15 | Radio-Sputnik 15 | Linear Transponder Downlink | SSB/CW | Semi-Operational |
| 435.352 | RS-22 | RS-22 | TLM Beacon Downlink | FM | Operational |
| 435.215 | RS-30 | RS-30 | TLM Beacon Uplink | CW | Operational |
| 435.315 | RS-30 | RS-30 | TLM Beacon Uplink | CW | Operational |
| 437.910 | SO-33 | SEDSat-OSCAR 33 | Packet Downlink | FSK | Semi-Operational |
| 1266.687 | SO-33 | SEDSat-OSCAR 33 | Packet Uplink | FSK | Semi-Operational |
| 145.850 | SO-50 | Saudi-OSCAR 50 | FM Voice Repeater Uplink | FM | Operational |
| 436.795 | SO-50 | Saudi-OSCAR 50 | FM Voice Repeater Downlink | FM | Operational |
| 145.875 | SO-67 | Sumbandila Oscar 67 | FM Voice Repeater Uplink | FM | Semi-Operational |
| 435.345 | SO-67 | Sumbandila Oscar 67 | FM Voice Repeater Downlink | FM | Semi-Operational |
| 145.826 | UO-11 | UoSat OSCAR 11 | TLM Beacon Downlink | FM | Semi-Operational |
| 145.860 | VO-52 | VUSat OSCAR-52 | Beacon Uplink | CW | Operational |
| 145.936 | VO-52 | VUSat OSCAR-52 | Beacon Downlink | Carrier | Operational |
| 145.925 - 145.875 | VO-52 | VUSat OSCAR-52 | Linear Transponder Downlink | SSB/CW | Operational |
| 145.930 - 145.870 | VO-52 | VUSat OSCAR-52 | Linear Transponder Downlink | SSB/CW | Operational |
| 435.220 - 435.280 | VO-52 | VUSat OSCAR-52 | Linear Transponder Uplink | SSB/CW | Operational |
| 435.225 - 435.275 | VO-52 | VUSat OSCAR-52 | Linear Transponder Uplink | SSB/CW | Operational |
| 436.000 | - | BEESAT | TLM Beacon Downlink | CW | Operational |
| 436.000 | - | BEESAT | TLM Beacon Downlink | FM | Operational |
| 436.000 | - | BEESAT | TLM Beacon Downlink | FM | Operational |
| 435.245 | - | CAPE-1 | Beacon Downlink | FM | Semi-Operational |
| 145.825 | - | Castor | TLM Beacon Downlink | FM | Unknown |
| 437.275 | - | COMPASS-1 | TLM Beacon Downlink | FM | Semi-Operational |
| 437.405 | - | COMPASS-1 | Telemetry Downlink | FM | Unknown |
| 437.075 | - | GeneSat-1 | TLM Beacon Downlink | FM | Operational |
| 437.325 | - | ITUpSAT1 | Beacon Downlink | CW | Operational |
| 437.325 | - | ITUpSAT1 | TLM Beacon Downlink | FM | Operational |
| 437.385 | - | KKS-1 | Beacon Downlink | FM | Operational |
| 437.445 | - | KKS-1 | Digital Downlink | FM | Operational |
| 437.325 | - | PARADIGM | TLM Beacon Downlink | FM | Unknown |
| 437.325 | - | PARADIGM | TLM Beacon Downlink | FM | Unknown |
| 437.325 | - | PARADIGM | TLM Beacon Downlink | FM | Unknown |
| 29.400 | - | PCSat2 | Digital Uplink | PSK | Semi-Operational |
| 145.825 | - | PCSat2 | APRS Uplink | AFSK | Semi-Operational |
| 145.850 | - | PCSat2 | APRS Uplink | AFSK | Semi-Operational |
| 435.275 | - | PCSat2 | APRS Downlink | AFSK | Semi-Operational |
| 435.275 | - | PCSat2 | Digital Downlink | PSK | Semi-Operational |

| Frequency | OSCAR | Satellite | Service | Mode | Status |
|-----------|-------|-----------|---------------------|------|------------------|
| 435.275 | - | PCSat2 | Telemetry Downlink | AFSK | Semi-Operational |
| 437.250 | - | PRISM | TLM Beacon Downlink | FM | Operational |
| 437.425 | - | PRISM | TLM Beacon Downlink | FM | Semi-Operational |
| 437.425 | - | PRISM | TLM Beacon Downlink | FM | Semi-Operational |
| 437.275 | - | STARS | Beacon Downlink | FM | Unknown |
| 437.305 | - | STARS | Beacon Downlink | FM | Unknown |
| 437.465 | - | STARS | Beacon Downlink | FM | Unknown |
| 437.485 | - | STARS | Beacon Downlink | FM | Unknown |
| 437.505 | - | SwissCube | Beacon Downlink | CW | Operational |
| 437.505 | - | SwissCube | TLM Beacon Downlink | FSK | Operational |
| 437.385 | - | UWE-2 | TLM Beacon Downlink | FM | Operational |



Above: Satellite AO-40

Left: Kiwi-Sat

AN INTRODUCTION TO THE WORLD OF DX

by Lee Jennings ZL2AL

DXing is addictive

The greatest lure in amateur radio is to contact someone else in another country. When you first start out into the world of DXing, DX may be 100km but later you will work into every corner of the planet. With some hams, it becomes an absolute obsession and they will go to any length to contact that country they haven't worked yet. For others, it is a pleasure to rag chew with an amateur in a foreign country and to learn more about that country and its culture. DXers often end up meeting other DXers when they travel and many lifelong friendships are made this way. DXing is a competitive sport. You will find out the moment that you hear some rare DX that a thousand other hams heard that same station and are also calling at the same instant. The problem is that many of your competitors are outstanding operators with high power, excellent antenna systems and vast experience. Most of your competitors are average operators with average



stations and antennas and they are easy to compete with. You just have to be a bit more cunning with your skills but eventually you can work up to competing with the top group. That rare DXpedition will usually work the big guns first and then you can easily make the contact at the end of their stay at the rare location.

Currently there are 338 DXCC "Entities" eligible for the ARRL DXCC award program. DXCC is the premier award in ham radio and entry to the "Club" may be gained by working and confirming 100 entities. An Entity can be as large as Australia or as small as St Peter and Paul Rocks out in the South Atlantic Ocean. There are rules that govern

what constitutes an "Entity" and they may be found on the ARRL Website where you can find the rules for the various awards and download the application forms. CQ Magazine in the USA that runs the Worked All Zones awards program and sponsors major contests throughout the year has the rules on their website also. Usually you start off with trying to work the first one hundred countries or entities and that will be a milestone for you. It will teach you how to get involved with a pileup and how to be a bit cunning when you do. It will teach you that other DXers in other countries may not have the same sense of fair play as you do. The second 100 countries are a little more difficult to work. Achieving 300 countries is very difficult and will usually take many years for a variety of reasons including sunspot cycles, the rarity of the country and how often its government will allow amateurs to operate there. Currently (2008) there are 338 DXCC Entities and the last 35 entities are extremely

difficult to work. Very few ZL amateurs have managed to do it. But the challenge is always there and it becomes a passion to achieve it.

Strategies for successful DXing

There are some proven strategies that work. Listen to the operator and find out where he is listening and if he is working split frequencies. Working "split" is not difficult, just different. It's a new skill for you to learn. Find out where the thousands of other operators are transmitting and avoid the pack. Position yourself just off the edge of the pack. Refine your timing so that you will be heard in a "gap" rather than in with the pack. Placement and timing is everything. Your signal should be slightly out of the pack so you will be noticed and your call should be slightly out of sync with the pack and just delayed a bit so that he will hear you start your call but not delayed long enough that you are calling on top of the guy the DX station has already decided to work and is answering. Successful experienced DXers are extremely skilful with their timing and consequently work the DX. You may not be heard on your first or second call or even after a few hours of calling. Be patient! Sometimes it's an exercise in pure frustration but persistence usually wins and it's an absolute joy when you snag that new country. Top level DXing is not easy but you will learn that amateur radio is more than inhabiting your local 2 metre repeater. You will also be rewarded with friendships around the world and an understanding of other cultures.

Is CW worth the effort?

It really is true that it's easier to work DX on CW than on Phone because there are fewer stations clamouring for the attention of a DX station on CW. CW will still be around for the foreseeable future in spite of recent changes in amateur licence regulations around the world. Weak CW signals are more readable than weak Phone signals. Hone your CW skills. DX stations often run 20 wpm or more and while most of them are courteous and will come back to a station calling at 12 or 15wpm, it's very satisfying to be able to work them at the speed they're calling CQ. Life is much easier with an electronic keyer as it takes the work out of sending your call over and over. There is nothing worse than operating with a pair of uncomfortable, ill fitting, harsh sounding headphones. Invest in a good set of headphones to help

you dig out the weak ones and avoid fatigue. A better idea is to buy a quality boom microphone headset with a good sounding microphone cartridge.

Work the contests

Contests can be intimidating, but your best chance for working new countries is often during the DX contests. Contest groups often will activate multi-multi stations in rare countries and they are easy to work. I recall working CN2R in Morocco on 80m a few years ago. Re was S9+ and begging for 80 m contacts and very easy to work. You don't do not have to work the entire contest, nor do you have to send in the logs for scoring. Figure out what information they're expecting you to exchange with them, either by listening to several contest QSOs or by reading the contest rules on www.contesting.com then just jump in and start working stations.

What bands to operate

The seven popular amateur radio bands offer the DXer propagation to most parts of the world most of the time. When the sunspot count is between the eleven year peaks, the higher bands like 10, 12, 15, 20 M are poor and opportunities are limited. 40M and 80M come into their own and some excellent DXing abounds providing you have good antennas. DXing is more difficult on 80 and 160m because the ambient noise levels are often intolerable in urban areas. When the propagation is right and the bands are open at sunrise and sunset, 80 and 160m can be extremely rewarding with worldwide contacts. We are fortunate here in the Asia Pacific region as many rare DXpeditions take place and are easy to work on the lower bands. When the sunspots reach maximum every eleven years the higher bands are magic. The next peak will be in 2012. 10, 12 and 15m will often be open 24 hours a day and it is relatively easy to work 100 countries during a weekend contest. Having a ZL call is a wonderful asset. ZLs are reasonably rare in other parts of the world and there are not that many ZL DXers to compete with. ZLs are often the first "real" DX station that Europeans work. ZL DXers are respected around the world and we have some world class Kiwi DXers amongst us. It is not uncommon to call a CQ on 15 or 20M and generate a pileup of Europeans or North Americans that may go on for hours.

Operating aids

The DXer has far more tools at

his disposal than he had 30 or 40 years ago. Then, you heard a rumour, read monthly DX magazines or received a phone call from a trusted friend. You listened daily, you waited and finally you would hear that weak rare station and attempt to work him with primitive valve equipment. Today's modern DXers have computers with the Internet based newsgroups, real time packet clusters, propagation prediction programs and information not dreamt of by old timers in the game. Today one knows where and when the rare DX will operate. With a few mouse clicks the modern well equipped station will change the radio to that frequency and mode, track the amplifier to the right band, select the correct antenna system, turn the beam to the heading and set his call up in the logging program in a few seconds. Sounds easy! The reality is that you still have to use your skills to get your call in his electronic logbook. And it doesn't get any easier as thousands of other hams have the same technology. Below are some web links to programs and services that will help you work DX.

www.ac6v.com/ - The definitive reference site for ham radio— Over 6000 links.

www.dxatlas.com/ - DX Atlas, a great program for DXCC, WAZ, IOTA info plus brilliant Grayline and path headings.

www.qrz.com - The online address and QSLing data base for most hams around the world.

www.eham.com - A great source of info on general ham radio
www.contesting.com - Keep up to date with international contests

www.dx4win.com/ - Excellent logging program.

www.writelog.com/ - Excellent contest logging program.

www.kc4elo.com/index.html - Free but very good logging program.

www.eqf-software.com - Some great logging programs.

www.qsl.net/w6elprop/ - Propagation prediction (and it's free!).

www.rchalmers.users.ch - DX Cluster program (and it's free!).

<www.yahoo.com> Subscribe to the KiwiDX List Newsgroup You will be in touch with other keen DXers around New Zealand.

<www.cq-amateur-radio.com/awards.html> The CQ Magazine awards and contest website.

www.arrl.org/awards/dxcc/ The ARRL DXCC awards and contest website.

www.dxawards.com/book.html

- The K1BV Awards directory listing for 3227 awards.

www.oh2aq.kolumbus.com/dxs/ - The DX Summit-Live DX cluster spots 24 hours a day.

www.ac6v.com/morseaids.htm - The definitive web page on Morse code - worth going to even if you don't understand it or use it!

Packet cluster networks

Packet clusters have been a phenomenon of the DXing world over the past 10 or 15 years. Basically it works like this. There may be a local Internet based Cluster or VHF packet channel Cluster in a city in Europe somewhere and a group or cluster of hams are connected to it. When someone in the group works a rare station he types into his cluster software the details in the following format: DX 14015 ZD9BV Calling CQ. The last comment is optional. The message or "spot" immediately appears on the screens of all connected to that cluster. Most clusters are now linked to the internet and there are more than 1000 of them around the world in every populated area. As soon as that spot hits the internet it spreads to all the cluster nodes and you will see it on your screen in your shack. In fact you will see a continuous stream of DX stations, Announcements and WWV information on your screen 24 hours a day. There are many free programs available. DX packet clusters are a wonderful tool for chasing DX

Minimum-maximum Station gear

There are some facts to consider when you are thinking about investing in equipment for your station.

- 1 The Operator on the other end can't tell whether you have the latest all singing, all dancing multi featured transceiver costing in excess of \$8K or a 30 year old valve radio you picked up at a junk sale for \$300. 100W is 100W. Both are equal. The only difference is that the older radio may not have all the latest modern features.
- 2 The stations with the 30m towers and stacked 5-el monobanders driven by very large amplifiers will often beat you in a pileup. These are the guys that work the rare DX first and they love doing it. After they have done it ... they go away and let the rest of us work the station. As long as you are aware of the big guns, it's not a problem because time

will be kind to you.

- 3 The stations that have the "best" sounding audio will always win in a pileup. It is human nature that the DX station will always take the path of least resistance and work the station he can understand and clearly hear the easiest. Best means clean, punchy and standing out from the rest. Commercial broadcast announcers are picked because of their mellow authoritative voices. Be aware of your own limitations and strive for the best audio you can generate. An authoritative voice helps!
- 4 With CW-You will need an electronic keyer and clean keying set a bit below the pack's general speed. This is better than trying to impress the DX station that your electronic keyer can do 45 wpm with ease. He can't! – Well, actually some DX ops can but they are rare.
- 5 At the end of the day everything helps, but don't get hung up on particular antennas or brands of radio equipment. They are only part of the picture. A good antenna is the second best investment you will ever make. The first is taking the time to learn the techniques and skills of how a rare DX station thinks and operates. A cunning operator will outwit a big antenna every time!

Computer logging

Computer logging programs are almost essential for those who have a large number of QSOs. Over time they become one of the best tools around for keeping things in order. Don't start out with a cheap shareware logging program. A key factor in a logging program is to be able to display various award details in DXCC entity order as one has them

worked or confirmed. The main prestige awards are DXCC, WAZ, DXCC Challenge, WAS, WAC, IOTA. There are thousands of others. When you want to see how your goals are being met, you can look at your statistics right on the computer screen. Computer logging programs are a great time saver because most of them generate data and address labels that will save hours and hours of handwriting. Computer logging can keep track of QSLs sent and received with just a click of the mouse. A really good computer logging program will do all of the above and control your radio, send CW, display your local packet cluster DX spots and print the QSO information directly onto your QSL cards with no labels involved.

The process of QSLing

If a newcomer to DXing starts out by working DX stations during contests he will quickly learn that he will work key countries multiple times. I would make the bureau one of my first choices. The QSL Buro Service here in New Zealand is excellent and it will save you postage costs. If you use the NZ Buro a lot make a donation every now and then! My best advice is to save your postage dollars and greenstamps (One US Dollar) for your rare station direct QSL requests. Confirming DXCC takes time and by the time one gets close to 100 different confirmed countries, several months or years will pass. There are several systems of filing, and the one that is probably the most common is to keep QSLs in order by DXCC entity. Shoeboxes help and they are inexpensive. There are some neat boxes sold by the big chain stores here in New Zealand to file photographs in and they are excellent for QSLs. Keeping QSLs in DXCC entity

order is the first step in being able to find and sort cards for awards later down the line. Believe me, it is not an easy task to sort a couple of thousand QSLs from scratch. Be smart and start sorting at the very beginning.

Awards and rewards

The ARRL DXCC Program

ARRL DXCC Honour Roll, 5 Band DXCC, WAS, 5BWAS, the DXCC Challenge Award and the CQ WAZ awards are the most prestigious awards in ham radio. Actually, there are over 3200 awards available to wallpaper your shack. Only the above few really measure how well you compete with other DXers around the rest of the world. In fact the list of awards that can be earned for working certain collections of DX stations is almost endless. www.ac6v.com/ will give you a link to the universal awards page. We have some world class DXers in New Zealand but only a few ZLs have managed to achieve the ARRL DXCC Honour Roll award. We now have a authorized ARRL DXCC Card checker in New Zealand which means you do not have to send your precious cards to the USA for verification. Contact Lee ZL2AL leejen@paradise.net.nz for further information. Your DXCC QSOs may also be verified online on the ARRLs website LoTW (Logbook of the World)

DXpeditions

If DXing is an obsession, then DXpeditioners are the lunatic fringe of the DX world. At any given time there are hundreds of amateurs operating from rare locations around the world. You can be assured that there are thousands of others actively planning a DXpedition somewhere and hundreds of thousands of "armchair DXpeditioners" who

would love to go. Planning a major DXpedition is almost as complicated as a NASA mission. Large scale modern DXpeditions can chew through \$200,000 or more in no time so it isn't a project that can be taken on lightly. New Zealand just happens to have ten or more of some the rarest DXCC entities islands within its territory. ZL7–Chatham Island, ZL8–Raoul Island and ZL9–Campbell and Auckland Islands are usually in the top 25 most wanted entities. The demand continues unabated and opportunity abounds for ZLs to organize more trips to these desired locations. It is the experience of a lifetime to participate as an operator on a DXpedition. The camaraderie and experience gained is incomparable. DXpeditions to ZL7 are easily organized, tremendous fun and are to be recommended for gaining experience. When you consider all these factors, it is no wonder that DXing is so popular even though we are at the bottom of the eleven year solar cycle in 2009 there are always rare DX stations around to be worked. As the propagation becomes better over the next few years HF DX will improve. When sunspot cycle number 24 peaks in a few years from now you will experience fabulous world-wide propagation. I am trying to provide tips and information in this section to help you succeed in DXing, whether you are a newcomer 10 DX or a DXing veteran. If you would like to find out more about DXing, contact me at leejen@paradise.net.nz and I will be happy to put you in touch with DXers in your area. You should also subscribe to the Yahoo Kiwi DX List reflector for up to the minute information.

The worst day DXing sure beats the best day working!

73, *Lee Jennings ZL2AL*

ZL DXCC

Reproduced courtesy Duncan McMahon ZL3JT

| Call | Mix | Ph | CW | RTY | 5BDXCC | 160 | 80 | 40 | 30 | 20 | 17 | 15 | 12 | 10 | 6 | 2 | De Soto |
|------------------|------------|------------|-----|-----|--------|-----|-----|-----|----|-----|----|-----|----|-----|---|---|---------|
| ZL1AA | 129 | | | | | | | | | | | | | | | | |
| ZL1AAR | | 116 | | | | | | | | | | | | | | | |
| ZL1ACZ | 141 | | | | | | | | | | | | | | | | |
| ZL1AH | 352 | | | | | | | | | | | | | | | | |
| ZL1ALD | 103 | | | | | | | | | | | | | | | | |
| ZL1ALE ** | | 349 | | | | | | | | | | | | | | | |
| ZL1AMN ** | | 350 | | | | | | | | | | | | | | | |
| ZL1AMO ** | 366 | 359 | 341 | | Yes | | # | # | | # | | # | | # | | | |
| ZL1ANF | 144 | | | | | | | | | | | | | | | | |
| ZL1ANH | 301 | 290 | | | | | | | | | | | | | | | |
| ZL1ANJ | | 301 | | | | | 103 | 115 | | 267 | | 237 | | 213 | | | |

| Call | Mix | Ph | CW | RTY | 5BDXCC | 160 | 80 | 40 | 30 | 20 | 17 | 15 | 12 | 10 | 6 | 2 | De Soto |
|---------------|-----|------------|-----|-----|--------|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|---|---------|
| ZL1ARY | 369 | 364 | | | | | | | | | | | | | | | |
| ZL1AYZ | | 174 | | | | | | | | | | | | | | | |
| ZL1BDQ | 321 | | | | Yes | | # | # | | # | | # | | # | | | |
| ZL1BIV | 104 | | | | | | | | | | | | | | | | |
| ZL1BJN | | 109 | | | | | | | | | | | | | | | |
| ZL1BKX | | 340 | | | | | | | | | | | | | | | |
| ZL1BLY | | | 103 | | | | | | | | | | | | | | |
| ZL1BOQ | | 341 | | | Yes | | # | # | | # | | # | | # | | | |
| ZL1BWK | 321 | 321 | | | | | | | | | | | | | | | |
| ZL1BYA | 101 | | | | | | | | | | | | | | | | |
| ZL1BZT | | | 105 | | | | | | | | | | | | | | |
| ZL1CYK | 119 | | | | | | | | | | | | | | | | |
| ZL1HY | 346 | 346 | | | Yes | | # | # | | # | | # | | # | | | |
| ZL1KJ | | 251 | | | | | | | | | | | | | | | |
| ZL1NI | 107 | | | | | | | | | | | | | | | | |
| ZL1OK | 250 | | | | | | | | | | | | | | | | |
| ZL1OGX | | 103 | | | | | | | | | | | | | | | |
| ZL1SZ | | 313 | | | | | | | | | | | | | | | |
| ZL1WG | | 337 | | | | | 119 | 161 | | | | | | | 156 | | |
| ZL2AAA | 287 | 287 | | | | | | | | 227 | 155 | 140 | | 104 | | | |
| ZL2ACP | 328 | | | | | | | | | | | | | | | | |
| ZL2AFT | | 354 | | | | | | | | | | | | | | | |
| ZL2AGY | # | | # | | Yes | | # | # | | # | | # | | # | | | |
| ZL2AJV | | 109 | | | | | | | | | | | | | | | |
| ZL2AKI | | | | 149 | | | | | | | | | | | | | |
| ZL2AL | 336 | 325 | 309 | | Yes | | 202 | 204 | 162 | 315 | 105 | 210 | | 142 | | | 1410 |
| ZL2AMI | | | | 100 | | | | | | | | | | | | | |
| ZL2AOH | 112 | | 101 | | | | | | | | | | | | | | |
| ZL2ASM | 328 | | | | | | | | | | | | | | | | |
| ZL2AYZ | 144 | 174 | | 107 | | | | | | | | | | | | | |
| ZL2BB | | | 105 | | | | | | | | | | | | | | |
| ZL2BLC | | 323 | | | | | | | | | | | | | | | |
| ZL2BNI | | 105 | | | | | | | | | | | | | | | |
| ZL2BRB | | | 261 | | | | | | | | | | | | | | |
| ZL2BRQ | 204 | 193 | | | | | | | | | | | | | | | |
| ZL2BRS | | 329 | | | | | | | | | | | | | | | |
| ZL2CC | 202 | 198 | | | | | | | | | | | | | | | |
| ZL2CV | 100 | | | | | | | | | | | | | | | | |
| ZL2GEO | | | 104 | | | | | | | | | | | | | | |
| ZL2IFB | 231 | | 229 | | | | 106 | 186 | 117 | 149 | 100 | 121 | | | | | |
| ZL2JJ | | | 226 | | | | | | | | | | | | | | |
| ZL2JON | 182 | 108 | 111 | 126 | | | | | | | | | | | | | |
| ZL2JR | | | | | | 131 | | | | | | | | | | | |
| ZL2KA | | | 100 | | | | | | | | | | | | | | |
| ZL2LE | 231 | 231 | | | | | | | | 161 | 130 | 109 | | | | | |
| ZL2MM | | 115 | | | | | | | | | | | | | | | |
| ZL2NBK | | 104 | | | | | | | | | | | | | | | |
| ZL2RR | | 345 | 182 | | | | | | | | | | | | | | |
| ZL2RVW | 192 | | | | | | | | | | | | | | | | |
| ZL2ST | 342 | 310 | | | | | | | | | | | | | | | |
| ZL2US | | 105 | | | | | | | | | | | | | | | |
| ZL2UW | # | # | | | Yes | | # | # | | # | | # | | # | | | |
| ZL2VS | 341 | | | | | | | | | | | | | | | | |
| ZL3AB | 111 | | | | | | | | | | | | | | | | |
| ZL3CED | 101 | | | | | | | | | | | | | | | | |
| ZL3DW | 124 | 110 | | | | | | | | 105 | | | | | | | |
| ZL3GS | 362 | 362 | | | | | | | | | | | | | | | |

| Call | Mix | Ph | CW | RTY | 5BDXCC | 160 | 80 | 40 | 30 | 20 | 17 | 15 | 12 | 10 | 6 | 2 | De Soto |
|--------------|------------|-----|-----|-----|--------|-----|-----|-----|-----|-----|-----|-----|----|-----|---|---|---------|
| ZL3IX | | | | | | 151 | | | | | | | | | | | |
| ZL3JT | 340 | 339 | 333 | 256 | Yes | | 143 | 242 | 221 | 339 | 183 | 310 | | 242 | | | 1806 |
| ZL3JU | 341 | 336 | | | | | | 148 | | 336 | | 114 | | | | | |
| ZL3NB | 173 | | 161 | | | | | 100 | | | | | | | | | |
| ZL3NS | | 367 | | | | | | | | | | | | | | | |
| ZL3NW | 108 | 108 | | | | | | 108 | | | | | | | | | |
| ZL3PAH | 106 | | | | | | | 100 | | | | | | | | | |
| ZL3REX | 123 | | | | | | | | | | | | | | | | |
| ZL3TY | 121 | | | | | | | | | | # | # | | | | | |
| ZL4AS | 302 | 291 | 210 | | Yes | | # | # | 130 | # | 124 | # | | # | | | 1228 |
| ZL4AW | 329 | | | | | | | | | | | | | | | | |
| ZL4CR | 160 | | 125 | | | | | | | | | | | | | | |
| ZL4NR | | 107 | | | | | | | | | | | | | | | |
| ZL4PN | | 198 | | | | | | | | | | | | | | | |
| ZL4PW | 293 | 241 | 264 | | | | 125 | 197 | 179 | 275 | 199 | 146 | | | | | 1243 |
| ZL4QJ | | 330 | | | | | | 150 | | 111 | | | | | | | |
| ZL4SA | | 113 | | | | | | | | | | | | | | | |
| ZL0AKH | 109 | | | | | | | | | | | | | | | | |

Number shaded indicates current Honour Roll, but totals include "deleted entities"

indicates total not promulgated in DXCC lists

E&OE and silent keys not listed where known

Call signs and totals in **bold** indicate "Top of the Honour Roll" credited.

** Indicates Hall of Fame inductees

EMC – Electro Magnetic Compatibility

by Bob Vernal ZL2CA

EMC (electromagnetic compatibility) may sound as if it is a new topic, but it has been around ever since electrical applications were first developed. Radio and electronic applications need to take account of how one application could interact with another, and consider limits so that all applications could co-exist. In the case of amateur radio, the possible impacts of operating a transmitter are the most obvious situation to consider for compatibility, as the intended radio transmission will have high signal level at the antenna, and decaying in strength in radial directions. EMC can be regarded as having two parts:

- EMI, electromagnetic interference, where disturbance results from an emission, which could be from non-radio equipment such as a computer.
- EMS, electromagnetic susceptibility, where exposure to an intended radio transmission gives degraded performance to victim equipment such as an audio amplifier.

Should EMC problems arise then there is usually some sort of

trade-off to consider by affected parties:

- Is the problem due to a transmission deficiency?
- Is the problem due to susceptibility (even with a "clean" radio emission)?
- What are the choices to solve the EMC problem?
- What are the costs of EMC treatment?

There should be very few, if any, circumstances where an amateur operator is forced to cease operation solely because of EMC difficulties. The end objective of clearing EMC problems should be to develop a practical result that is acceptable to all affected parties. There are advantages for amateur operators who are conversant with EMC causes and cures, as they can put their knowledge into practice should an EMC problem crop up with their station, or help others.

C-tick and product compliance in New Zealand

Electrical products for sale in New Zealand are regulated by "C-tick" compliance. Appliances with a C-tick should meet standards for control of RF emissions (even for

apparatus that has no intended emission). While the C-tick arrangement is generally good for minimising "environmental RF fog", the compliance limits are mainly to protect broadcast service reception, which involves relatively strong wanted signal strengths, so compliance with C-tick may still be well above the noise floor of a sensitive amateur receiver with an antenna near the appliance in question. C-tick is silent on RF susceptibility.

EMC compliance in other countries

C-tick is basically an Australasian arrangement. FCC Part 15 Class B covers emissions for apparatus intended to be used in residential situations, and is very similar in emission limits to C-tick. FCC Part 15 Class A caters for industrial apparatus and has higher emission limits than Class B. The European CE standard includes emission and susceptibility testing, so has wider scope than C-tick. However, as for C-Tick, compliance with EMC standards in other countries is short of any blanket assurance that there could be no issues for

amateur radio operation and weak signal reception.

Some Basic Physical Factors for Electric and Magnetic Fields

EMC is fundamentally to do with electric or magnetic energy interactions. It is generally desirable to keep one circuit sensibly isolated from another, but sometimes coupling may arise in unforeseen ways. Coupling could be by any or all of the basic mechanisms, namely:

- Conduction by electron currents flowing in physical conductors
- Induction by electric or magnetic flux linkages (reactive energy)
- Radiation by way of outgoing electro-magnetic fields (radiated energy)

Radiation is of course what communication by radio is all about. The EMC challenge is to carry out amateur radio activities with minimal unwanted interaction with other equipment or services.

In the vicinity of a transmitting antenna there are magnetic and electric energy fields that are a complex combination of

reactive (stored) and radiated (net outgoing) components. The specific reactive and radiated components depend on the type of antenna (different for monopole, dipole or loop). The strength of the near field falls away quite rapidly with increasing separation from an antenna (that is transmitting). Increasing the separation distance is always a winner for reducing EMC problems. Even with EMC problems inside the shack, like one piece of equipment placed adjacent to another, a modest shift can have a large impact. When it comes to suppressing unwanted signals, it is usually best to work on finding the root cause and trying to stop the unwanted signal from travelling away from the source. While prevention is better than cure, if the unwanted signal can not be prevented from developing then the next strategy is to minimise the ways in which it may spread.

EMC countermeasures include the following techniques:

- Shielding (solid metal, even double screening)
- Bypassing (usually a suitable capacitor with low series resistance)
- Filtering (suitable series and shunt components)
- Suppression (usually within the equipment itself)

Note that many types of plastic equipment cases are transparent to RF and have useless shielding properties at the frequencies involved.

Filter applications

Filters are one of the basic electronic building blocks that can make the difference between communications being satisfactory or unsatisfactory. There are many types of filter, designed for many applications and for many source or load impedances. Refer to a radio handbook for details on filters. Proper use of filters is central to solving EMC problems.

A low pass filter in the antenna feeder can be a useful accessory for an amateur station, to give a confidence to operating and control of harmonics. When harmonics fall in television bands, the level should be low enough that the air path to a neighbour's receiving antenna has sufficient loss to not result in interference.

Be wary of the specifications of cutoff frequency for low pass filters made for HF operation. In Europe and the USA the lowest band edge for television is 54 MHz. In New Zealand television channel 1 has a lower band edge of 44 MHz. So a low pass filter designed to protect 54 MHz is

going to be short of filtering at 44 MHz. It so happens that some USA manufactured low pass filters are designed to also cater for IF breakthrough for USA television receivers, so are designed to have good rejection upwards from 41 MHz, so these types of low pass filter are best for control of amateur band harmonics falling in New Zealand television channel 1.

Band pass filters can be useful for some amateur situations, such as for reducing strong non-amateur signals from getting into and overloading amateur receiver front ends. Field days or contests with multi-transmitter multi-band operation are examples where extra RF filtering is very useful. Television receivers may have inadequate rejection of amateur HF frequencies. A useful countermeasure is to insert a high pass filter in the feeder to the television receiver.

The current trend with terrestrial television broadcasting is migration to digital modulation and only in the UHF band. This scenario is generally "easier" for amateur radio compatibility than is the case for analogue television receiving in VHF bands. Satellite television broadcasting involves receiving with very directional antennas and take-off angle well above the horizon, so is relatively immune from amateur radio operations.

Antenna Considerations

Antennas are the key to achieving overall effective performance of an amateur station. For nearly all types of antenna, the radiation efficiency and general effectiveness improve with antenna height above ground-level. The following factors can apply to high antennas:

- DX performance is usually better, on any band
- For receiving, gives some separation from local sources of QRM
- For transmitting, gives less exposure to ground level equipment or people
- Can run lower transmitter power and still sustain communications.

Ground-mounted vertical antennas have a reputation for having near fields (within a wavelength or so) that are "hotter" than those for other types of antennas. In a suburban situation, ground-mounted verticals have maximum radiation directly into nearby houses. The converse of what happens on transmit is that when on receive these ground-mounted verticals can easily receive neighbourhood QRM. While verticals can be effective for communication on the lower

bands, they are unfortunately also potential candidates for EMC problems in built-up areas. Best communication efficiency may be obtained by transmitting on the vertical and receiving on whatever antenna gives the best signal to QRM ratio of the desired amateur signal (the reciprocity theorem applies to wanted RF signals on the path, but practical communication also depends on levels of local QRM and that can be different for each station).

Horizontal centre-fed dipole antennas are inherently much more balanced in operation than ground mounted verticals. Dipoles have surrounding flux patterns that are similar in shape each side of the centre feedpoint. The actual balance of the near field of a dipole depends on the angle from which the dipole is "viewed". A dipole viewed "side-on" presents good balance but viewed "end-on" the near side of the dipole predominates over the far side. On transmit there are unavoidable high voltages (and high field strengths) around the dipole ends. This is also the case for any antenna with an "open end".

Loop antennas are inherently one of the most balanced of all antennas. Much of the near field flux is contained within the loop. A loop antenna has a more confined near field pattern than is the case with dipoles, so tends to do better for receiving in a QRM limited situation. Loop antennas are widely reported as being quieter on receive than other types of antennas, yet are still effective for weak signal reception. Similarly transmitting with a loop has more confined near field. A one wavelength circumference loop can also work on near multiples of wavelengths, and with a tuning unit it can be useful on most bands. A smaller sized frame loop antenna can be useful for reception, when sited in a low noise location and with orientation to make use of the nulls broadside to the frame to get best signal to QRM ratio.

Antennas can develop corrosion in connections, or fatigue breaks in some strands of a multistrand wire. A bad connection or intermittent touching in a fatigued wire not only impairs performance on receive, but can cause arcing when transmitting. Arcing generally results in broad band "click" interference and is obviously an undesirable situation. Even the best filtered transmitter in the country can cause EMC problems if there are bad connections in the antenna. Well-constructed and well-maintained antennas generally give least EMC problems. As

always, antennas should be mounted "in the clear" for best communication results and least invitation for EMC problems where RF power couples into surrounding structures.

Transmitting antennas and feeders should be kept away from television antennas or downleads as otherwise it invites large levels of amateur band signals arriving at the television receiver front end. Reciprocally, and QRM from the television signal could couple to the amateur feeder.

Desirability of using a balun with a balanced type of antenna

Even if a balanced type of antenna is selected for use, the actual balance of the overall antenna system depends on how the feeder is connected. If the feeder is coaxial cable then using a **balun** (**balanced to unbalanced transformer**) at the antenna feedpoint is one way of minimising RF current from flowing back down the outer of the coaxial cable rather than into the antenna proper. As well, a balun can minimise noise from travelling up the outer of the coaxial cable and making reception seem worse than it would be without the unwanted noise. Another technique for reducing the affect of the coaxial cable braid is to use an RF choke, typically by having a string of well-fitting ferrite toroids over the feeder. For making your own balun or choke, refer to an appropriate handbook for selection of core types.

Active Antennas

An active antenna can be useful for receiving, especially when there is local QRM. Active antennas can be physically very small in wavelength terms. Small size has a smaller near field zone. While a transmitting antenna usually has "full size" dimensions for radiation efficiency reasons, when used for receiving the larger size may be worse for pickup of local QRM. The main criteria for an effective active receiving antenna are that the delivered result has atmospheric noise (QRN) dominating over thermal noise (noise from the active antenna electronic devices). It is possible for a one metre whip with JFET input stage to be an effective active antenna over many bands, particularly lower bands where QRM can limit sensitivity. Siting the active antenna away from houses and power lines can often deliver a better signal to noise ratio of a wanted radio signal than for reception using a "transmitting" antenna.

An active antenna can be broadband. Frame loops can also be used as active antennas, but usually need to be tuned. A fairly long feeder is possible as the headend can incorporate enough active gain to compensate for some line loss. A multiwire cable is needed if power supply, tuning voltages and band switching control all need to be fed from the shack. If the power supply is mains powered, it needs to be carefully designed to resist breakthrough of mains-born noise. Obviously the active antenna electronics need to be designed for good linearity (low intermodulation) and survival from exposure to high signals (on-site transmission from another antenna). Great care should be taken with feeder connection so as to not inadvertently transmit into an active antenna; as such an experience usually renders it inactive until repaired. Transceivers with separately accessible receive only input are ideal for connecting to an active antenna, and not exposing receive only equipment to risk of a "bite" by inadvertent connection to a transmitter output.

Commercially Manufactured Transceivers

These days there are a great many commercially manufactured transceivers used by amateur radio operators. While it is a shame that home construction is less popular than in yesteryear, it should not be overlooked that the commercial "appliances" bring with them a reasonably high standard of performance in terms of suppression of harmonics and other types of unwanted emissions. Nearly all commercial transceivers include a good modulating stage, good signal filtering and a reasonably designed power output stage. In some countries there are regulatory requirements for limiting unwanted emissions, so commercial transceivers need to be designed for sufficient suppression of unwanted emissions if they are to qualify for marketing in those countries. The general result is that "big name" manufacturers tend to have good pedigree for EMC, as they seek international sales potential for their products.

Power supply considerations

The humble power supply should not be overlooked as a possible EMC situation. For example, on-site hum modulation can occur when RF gets into rectifier diodes. The resulting hum modulated signal then escapes by the reverse path of how it entered the power

supply. Regulated power supply action may malfunction should RF be conducted into the circuit via AC or DC power leads. General treatment for HF EMC problems is to use 0.01 μF disc ceramic capacitors to "bypass" all leads and semiconductors, but of course they should be checked for not slowing down the response of electronic voltage regulators being able to follow variations in current drawn from the supply. VHF EMC problems should be treated with lower value "bypass" capacitors, or even metal shields. Do not skimp on safety ratings with capacitors used on mains leads (if a capacitor is not marked as being 230 volts AC mains rated, then do not use it on mains wiring). Winding AC or DC leads on ferrite toroids can also be effective at reducing RF getting into a power supply or into equipment connected to the power supply.

Hum loops can be a problem when several separate pieces of equipment are connected up, as the grounded conductors in connecting leads provide a mesh of paths in which earth return current is able to flow. Power supply currents sharing conductors with low level audio signals is a recipe for coupling unwanted hum and noise to the audio feed. A very effective way of controlling power supply hum loops is by using split bobbin power transformers and two wire mains leads. A **split bobbin** transformer with a double insulated rating is legally able to be used with no earth wire, thus a potential hum loop via the mains earth is entirely avoided. For safety reasons this is **not** a technique to try with other than the proper rated split bobbin type of transformer. An isolation transformer in series with an existing power cord can be used with equipment that does not have a split bobbin transformer in its power supply, or as a way of testing where a hum loop arises. Isolation transformers have highest isolation at lower frequencies, and are limited by primary to secondary coupling capacitance in restraining higher frequencies from "jumping" the windings.

Switch mode power supplies may give high efficiencies and small package size, but there are inevitably "hash problems" for switching related QRM over several bands. One innovation in a commercial switch mode power supply for radio gear is to have a front panel "tuning knob" so the switching rate can be optimised for minimal interference falling on a given working frequency (and needs re-adjusting as

appropriate). Having a tuning knob does nothing to reduce the generation of hash or harmonics but instead arranges for them to be steered to least harmful spots on the dial.

For "wall wart" supplies (small power supply integrated with the plug) a lightweight one is likely to be switch mode and can generate broadband hash, whereas older types with iron-cored transformers are more likely to be neutral from an RF point of view. If swapping of a switch mode for iron-cored "wall wart" is contemplated, bear in mind that regulated output may be needed, and that most iron-cored wall warts have unregulated output.

Limitations Of Inductors

High frequency inductors are sometimes rated by the manufacturer for operation over a specified frequency range. This is a realistic reflection that unavoidable inter-winding capacitance results in self-resonance at some relatively high frequency, and also for losses in core or coil former material. For frequencies above self-resonance the "inductor" appears to behave more like a capacitor, and explains why some filters may not deliver the expected results at higher frequencies. What is intended on a circuit diagram and what happens to an installed inductor may not achieve the intended result. Inductors need to be carefully selected if wideband performance is sought.

Limitations Of Capacitors

Capacitors also become self-resonant at some high frequency, when resonance occurs with unavoidable inductance of the leads and body. All lengths of conductor have some inductance, so it is impossible to build a perfect capacitor that would work at any frequency. However, capacitors are generally useful over a much wider frequency range than is the case for inductors. Disc ceramic capacitors are generally the best all round performers for HF and VHF work. Surface mount capacitors have the shortest possible leads, but performance still needs to account for printed circuit track length. The rated upper frequency range of mains bypass capacitors is sometimes no more than a few megahertz. Polystyrene or polypropylene capacitors are generally the lowest loss type of capacitor in the audio and lower frequency bands.

Ferrite and Powdered Iron Components

There are many types of ferrite

and powdered iron cores, and care is needed to select an appropriate type for a given application. There is quite a difference between selecting a core for a low loss RF transformer and using a core to attenuate unwanted RF signals. Transformer cores working at signal frequencies generally require selection of a given type of core material that has low loss in the frequency bands of interest, especially where RF power is involved (a lossy core will soon be "cooked" and could have permanent deterioration of core parameters). For EMC applications ferrite material is generally selected for loss at frequencies that are much higher than for those when it would alternatively be used as a transformer core. Low Q absorptive mode of operation usually gives best EMC performance than reactive choking (reflects rather than absorbs QRM). A low Q choke is like having an inductively coupled series resistor in the circuit.

Split-core ferrites can easily be fitted over existing wiring, and can effectively add a series impedance to higher frequency signals in the wiring. Split-core ferrites are widely used commercially, for the likes of reducing radiated noise from computer cables (especially in the VHF broadcast bands). The split core (when fitted properly over a wire or cable) is equivalent to a one turn inductor with a toroid core, so not unexpectedly has fairly low impedance at lower frequencies, so does little to reduce conducted noise that happens to fall in the 160 or 80 metre amateur bands. Several turns on a high permeability core are needed for there to be useful attenuation in the MF and lower HF bands. Low band chokes can be made from U or E cores salvaged from scrapped switch mode power supplies. Highest choking is obtained with no shims and no air gap for U or E core mating faces.

Powdered iron cores have less permeability than ferrite but are generally superior for linear performance at transmitter output power level. Powdered iron cores are widely used for inductors in transmitter output filters, and most of these are in toroid (ring) form. Toroid cores are ideal for keeping most of the magnetic flux within a closed path (around the toroid) which not only leads to fewer turns for a required value of inductance but also minimises the flux that possibly links with other circuits.

Cores need to be selected for frequency range and whether it is for transmission or suppression.

For transmission applications, core size needs to be selected for power handling (with operation well away from saturation limits).

Telephones

Older technology telephones have passive components and have good immunity to RF exposure. Newer types of electronic telephone have ICs and semiconductor junctions that can demodulate even moderate levels of RF. It is difficult to offer useful EMC advice on selections of telephones for private ownership, as there are so many types of telephones in use, with new ones appearing, and marketing for low cost likely cuts corners in the specific area of RF immunity. An easy to try solution is a DSL filter inserted inline with the telephone that suffers RF interference. DSL filters are designed to separate off voice baseband by low pass filtering, and this can be useful for reducing RF pickup even if there is no DSL service on a given line (it does not matter if the DSL output socket is unoccupied, the low pass part of the filter can be used for non-DSL applications like keeping RF out of any telephone).

Controlling RF Pickup In Audio Amplifiers

The input stages of audio amplifiers can act as crystal sets and detect RF that happens to arrive with good level at the input device. The detected parts of the RF envelope that are in the audio range can thus be amplified by subsequent audio stages. A useful way of reducing RF arriving at the first audio stage is to use an RC low pass filter (a series

resistor followed by a parallel capacitor to equipment chassis or PCB earth). A resistor of a few hundred ohms (but could be as much as 10% of the amplifier input resistance) and a capacitor of a few hundred picofarads (but with a reactance that does not significantly reduce the level of the highest audio frequencies) can be very effective at controlling RF breakthrough. A suitable value series resistor is considered to be a more consistent performer than an RF choke (RFC). This is because the resistor retains its effectiveness over a very wide bandwidth, whereas the RFC may offer too little reactance to be effective at lower frequencies and become self-resonant below the desired upper frequency limit of operation.

Speaker leads also act as unintended aerials. RF pickup in the amplifier can be reduced by winding the speaker leads on a ferrite rod or ferrite toroid (this of course uses up some of the length of the speaker lead).

Computers and amateur radio

Many amateur operators use a computer in the shack. The computer motherboard involves a myriad of high speed digital signals for clocking and data processing, so there is usually very high potential for interference to be experienced by a nearby radio receiver. The power cord, keyboard cable, printer cable, mouse cable, monitor cable and COM or USB cables are also possible ways that "computer hash" can escape. A CRT monitor can produce magnetic deflection fields for quite a distance from the monitor. Wide bandwidth video drive signals may also

be noticed on nearby radio receivers. Nearly all computers and monitors use switchmode power supplies, which can also be "hash generators" from a radio perspective. Commercial leads with integral ferrite sleeves are likely optimised to reduce emissions in the VHF broadcast bands, so may have only moderate attenuation for lower amateur bands. Don't take for granted that a ferrite sleeve is good at attenuating QRM at lower bands, and if cords are long enough then better results could be had by winding multiple turns in a high permeability core (like E or U cores, check for no shims).

Before purchasing a computer, look for labels indicating FCC or CE compliance with EMC standards. Taming interference within a computer would be beyond the scope of any warranty offered on a computer, and also be a difficult challenge. Having a portable radio with frequency coverage on bands of interest is one way of evaluating relative interference in a shop situation. Monitoring with AM mode is much more informative than receiving on any other mode. Having an analogue S meter is useful for comparing levels. Some computers are quite acceptable for running in the shack alongside radio equipment. However, a "bad" computer can be an irritation for amateur radio operation.

Some switched mode power supplies have only token RF filtering and these can be quite bad for causing local interference. Fitting an external mains filter is generally not as effective as having the filtering components inside the power supply. One way of improving on a computer power supply causing QRM is

to swap out the power supply module for one that is claimed to have good RF filtering, and is also electrically compatible for socket pinout and voltages (AT, ATX, etc).

For radio data modes such as RTTY, packet, Amtor or Pactor, it is easy to for mains hum (and related power supply buzz from mains harmonics) to contaminate audio feeds. The solution is to use audio isolation transformers as these are like "braid-breakers" in preventing earth loop paths. Telephone style isolation transformers (can be salvaged from a scrapped dial-up modem) are ideal for using in a radio interface unit, as they have relatively high voltage isolation specifications. PTT control can be implemented with a suitable opto-isolator (a cunning way of providing the equivalent of a contact closure). Having a means of adjusting audio level is also handy, as computers can generate volts of audio drive and microphone inputs can easily be overloaded.

A lap top PC can have a very low level of overall radio noise. LCD displays are lower energy than cathode ray tubes, and lap top PCs generally have compact and well-shielded modular construction. In some cases an external switch mode power supply can be the worst interference generator in a laptop PC setup. An external power supply can be replaced by a low noise linear regulated power supply with the same DC output. Having the Internet available on a shack PC can be useful, and a WiFi feed is a "wireless workaround" to running data cables and risk of data QRM.

AREC – AMATEUR RADIO EMERGENCY COMMUNICATIONS

MISSION STATEMENT

To be the preferred provider of emergency communications to New Zealand Emergency Services.

The AREC was formed in 1932 following a devastating earthquake in Napier. Today, the AREC consists of 74 Sections throughout New Zealand, each with its own Section Leader who is responsible for the training and conduct of the Section. Each Section is attached to a Branch or Branches of NZART, from where members are drawn. Management of the AREC is vested in a National Director who is appointed by NZART Council. The National Director likewise appoints a Deputy, Secretary, Training Officer and Managers for the four districts. These

eight people form the AREC Management Group.

The current objectives are:

- To train and provide communications personnel, skilled in assisting organisations during emergencies.
- Maintain a close liaison with the New Zealand Police for Search and Rescue.
- Maintain a close liaison with Civil Defence.
- Maintain a liaison with community organizations.
- Provide and maintain equipment appropriate for emergency operations.

National Director AREC controls

the issue of AREC Station Identifiers, formally known as "E" call-signs. AREC Sections are listed in this publication, in identifier order, along with their Section Leaders and Deputies. The Section Identifier, in its basic two letter form, is issued to the Sections' Leaders for their use only. AREC Station Identifiers for Section use are then issued by the Section Leader for that operation/exercise, with the following being normally reserved:

"A" = Section Base Station
"X" = Established Relay Stations
"Z" = District Control Stations
AREC operators engaged in SAR

activities and operating on SAR frequencies are to use the call-sign allocated for that operation/exercise. This call-sign is to reflect the geographical location (nearest town) of the search area. Civil Defence's radio call-signs are controlled by the CD organization.

AREC emergency frequencies

The following frequencies are reserved for AREC use in emergencies:

1875–1900 kHz
3500 and 3900 kHz
7100 kHz

2 m and 70 cm repeaters
The general calling frequencies for AREC stations requiring assistance in emergencies are, 3900 kHz USB or local repeaters and these frequencies are normally monitored by AREC

personnel during events such as storms, earthquakes and other significant events that could give rise to emergencies.

AREC Sections' Net

A monthly net is held on 3900 kHz

USB at 1930 hours NZST or at 2030 hours NZDT on the third Monday of each month except December. This net uses the AREC Identifier of **ZK6E**, the AREC master station and is conducted as a contact net for

those Sections wishing to seek information or report activities of an AREC nature.

Be prepared for an emergency – What to do – Some suggestions

As an Amateur Radio Operator, who may become involved with an emergency of some kind and having access to assistance via radio could provide timely intervention to those in distress. Preparations for such an eventuality would be good planning and the following suggestions are offered.

- 1 Be familiar with your local repeater services and frequencies, with a knowledge of the service area.
- 2 In the event of an SAR requirement, contact your nearest Police station, they will activate their system.
- 3 For Civil Defence requirements, contact either your Regional or District Councils.
- 4 Be familiar with your AREC representatives or Club officials, keep a list in the house and car.
- 5 Use the AREC call frequencies or break-in on any net and identify yourself and the emergency at hand.

When making a call for assistance, by radio, ensure that all the vital details concerning the emergency are passed to the station that is contact the emergency services, this will enable a more appropriate response.

Police, Fire, Ambulance check list

Type of incident

Road accident—type and number of vehicles involved.

—Number and extent of injured or trapped persons.

Type of medical emergency—heart attack, electrocution, etc. What is on fire—car, building, stove, etc.

Kind of accident—car/truck, car/person, motorcyclist etc.

Hazardous chemicals involved—gases, liquids, fuel, etc.

Location of accident

Street or road name and number,

rural number, highway number.

Cross street or road reference.

Suburb and city or town.

Any other geographical detail to clarify location.

Other information

Vehicle registration number—burglar, hit and run, etc.

Description of people—clothing, height, race.

Direction of travel.

(If you are making a telephone call to the emergency services, make sure the above information is gained from the person on the radio before making the 111 call.)

Marine distress call

Intercepting a “MAYDAY” call, briefly listen to see if any other station is responding, then endeavour to contact the distressed vessel on the frequency and mode they are using. Do not get them to change frequency. Ask for details of the distress and write down the details given.

Essential information

Where Position, latitude and longitude, GPS information, any bearing and distance from geographical feature or place.

What What is the nature of the distress?

What help is required?

What battery life or restrictions are on radio use?

What lifesaving equipment is on the vessel?

Has an EPIRB been activated?

What is the weather at the distress position?

Who

Description of distressed vessel, name, registration and size.

How many people in distress and their ages.

Colour of vessel and distinguishing marks.

Also record the time and frequency of the distress call. If practical get another person to telephone in the information and stay on the frequency to gather other essential information. Tell the operator what assistance you are giving to help them.

Desirable information

Voyage details

Departed time, date, destination. Last known exact fix, if position unsure.

Medical details

Any specific medical needs or conditions?

Extent of injuries.

Safety equipment

Food and water available.

Other types of radio equipment, VHF, HF.

Flares and types available.

The station called Mayday, in fact, might not hear you calling because of propagation or other factors, but continue to listen, they could transmit their position details blindly. Regardless, report the distress call to the coast guard or Taupo Marine Radio stating the time and frequency, when first heard and any other details of the signal, background noises or how genuine it sounds.

Earthquake

In the event of a moderate or greater earthquake felt in your location, your assistance, through AREC, could be valuable to Civil Defence. Switch to your local VHF repeater and monitor for activity about the event. An AREC station may be requesting reports from stations on what has occurred in their locality. AREC will be gathering this information to put together a “Felt Report” (refer to Earthquake Reporting). This information is then relayed to Civil Defence to help them access the extent of damage that may have resulted.

Apart from estimating the intensity of the earthquake, any information about the state of the utility services and any other significant details known about your surroundings will be useful.

EARTHQUAKE REPORTING

THE MODIFIED MERCALLI SCALE OF INTENSITY OF EARTHQUAKES

Introduction

The severity of an earthquake can be expressed in two terms, namely intensity and magnitude. These two terms are different and are often confused.

Intensity is based on the effects of ground shaking on people, buildings, contents and natural surroundings and varies from place to place within the disturbed region. This observed effect depends on the location of the observer with respect to the earthquake epicentre (location within the earth's crust where the movement occurred).

Magnitude is related to the amount of seismic energy released at the hypocentre (point on the earth's surface directly above the earth movement). This measurement is made by and recorded on instruments (Seismograph) that have a common calibration, thus magnitude is determined instrumentally and uses the Richter Scale to indicate the magnitude. The Richter Scale bears little resemblance to how people perceive the intensity of an earthquake, thus the “Modified Mercalli Scale of Intensity” is measurable by people.

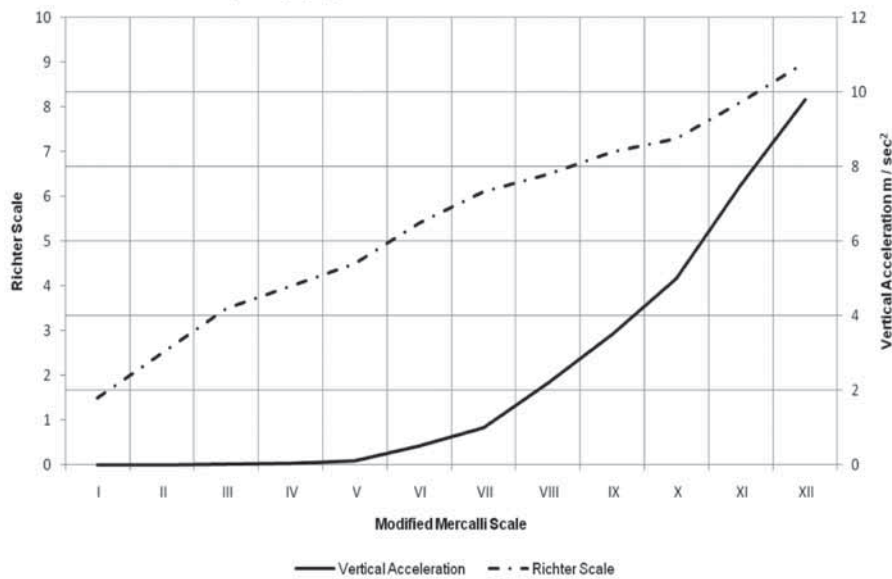
This scale is based on certain key responses being felt or observed by people who can then grade the intensity using this scale, and communicate this to others. When reporting an earthquake you should use this scale to convey the effects that had been felt in your location. When a number of reports are collected from an area and assembled in one place, a summary of this information then becomes known as a Felt Report (indicating the extent of the area it was felt over and what intensities were experienced).

Modified Mercalli Scale of Intensity

MM1 Not felt by humans, except in especially favourable circumstances, but birds and animals may be disturbed. Reported mainly from upper floors of buildings more than 10 storeys high. Tree branches, chandeliers, doors and other suspended systems of long natural period may be seen to move slowly. Water in ponds, lakes, reservoirs etc may be set into seiche oscillation.

MM2 Felt by people at rest

Approximate Comparison of Earthquake Intensity Standards
Modified Mercalli and Richter Scales
Courtesy www.geography-site.co.uk



indoors, especially by those on upper floors or otherwise favourably placed. The long period effects listed in MM1 may be more noticeable.

MM3 Felt indoors, but not immediately identified as an earthquake by most. Vibrations may be likened to the passing of a truck. It may be possible to estimate the duration, but not the direction. Hanging objects may swing slightly.

MM4 Generally noticed indoors, but rarely outdoors. Light sleepers may be awakened. Vibrations may be likened to passing heavy traffic, or to the jolt of a heavy object falling or striking the building. Walls and frame of building are heard to creak. Doors and windows rattle, liquids in open vessels may be slightly disturbed. Standing motor cars may rock, and the shock can be felt by their occupants.

MM5 Generally felt outside, and by most indoors. Most sleepers awakened. A few people frightened. Direction and motion can be estimated. Small unstable objects may be displaced or upset. Some glasses and crockery may be broken. Some large windows cracked/damaged. Hanging pictures move. Doors and shutters may swing. Pendulum clocks are affected.

MM6 Felt by all. People and animals alarmed. Many run outside. Difficulty experienced in walking steadily. Slight damage to masonry "D". Some plaster cracks or falls. Isolated cases of chimney damage. Windows, glassware and crockery broken. Object fall from shelves, pictures from walls. Heavy furniture moved. Unstable furniture overturned. Small church and school bells ring. Trees and bushes shake,

or are heard to rustle. Loose material may be dislodged from existing slips, talus slopes or shingle slides.

MM7 General alarm of people and animals. Difficulty experienced in standing. Noticed by drivers of motorcars. Trees and bushes strongly shaken. Large bells ring. Masonry "D" cracked and damaged. A few instances of damage to masonry "C". Loose brick and tiles dislodged. Unbraced parapets and architectural ornaments may fall. Stone walls cracked, weak chimneys broken, usually at the roof line. Domestic water tanks burst. Waves seen on ponds and lakes. Water made turbid by stirred up mud. Small slips, caving in of sand and gravel banks.

MM8 Alarm may approach panic. Steering of motorcars affected. Masonry "C" damaged with partial collapse. Masonry "B" damaged in some cases. Chimneys, factory stacks, monuments, towers and elevated tanks twisted or collapsed. Panel walls thrown out of frame structure. Some brick veneers damaged. Decayed wooden piles broken. Frame houses not secured to foundations may move. Cracks appear on steep slopes and in wet ground. Landslips in roadside cuttings and unsupported excavations. Some tree branches may be broken off. Changes in the flow or temperature of springs and wells may occur. Small earthquake fountains (fissures).

MM9 General panic. Masonry "D" destroyed, masonry "C" heavily damaged, sometimes collapsing completely, masonry "B" seriously damaged. Frame structures raked and distorted. Damage to foundations generally.

Frame houses not secured to foundations shifted off. Brick veneers fall and expose frames. Cracking of ground conspicuous. Minor damage to paths and roadways. Sand and mud ejected in elevated areas, with the formation of fissures and sand craters. Underground pipes broken. Serious damage to reservoirs.

MM10 Widespread panic. Most masonry structures destroyed, together with their foundations. Some well-built buildings and bridges damaged. Dams, dykes and embankments seriously damaged. Railway lines slightly bent. Concrete and asphalt roads and pavements badly cracked or thrown into waves. Large landslides on river banks and steep coasts. Sand and mud on beaches and flat land moved horizontally. Large and spectacular sand and mud fissures. Water from rivers, lakes and canals thrown up on banks.

MM11 Wooden frame structures destroyed. Great damage to railway lines and underground pipes.

MM12 Damage virtually total. Practically all works of construction destroyed or greatly damaged. Large rock masses displaced. Line of sight and level distorted. Visual wave motion of the ground surface reported. Objects thrown upward into the air.

Masonry categories

"A" Structures designed to resist lateral forces of about 0.1g that satisfy the New Zealand building code 1955. Typically, well reinforced ferro-concrete. All mortar is in good condition and the design and workmanship

THE R-S-T SYSTEM

Readability

- 1—Unreadable.
- 2—Barely readable, some words distinguishable.
- 3—Readable with considerable difficulty.
- 4—Readable with practically no difficulty.
- 5—Perfectly readable.

Signal Strength

- 1—Faint signals barely perceptible.
- 2—Very weak signals.
- 3—Weak signals.
- 4—Fair signals.
- 5—Fairly good signals.
- 6—Good signals.
- 7—Moderately strong signals.
- 8—Strong signals.
- 9—Extremely strong signals.

Tone

- 1—Harsh, broad hiss, no perceptible tone.
- 2—Harsh, broad hiss, just perceptible tone.
- 3—Harsh, broad non-sinusoidal tone.
- 4—Harsh, broad tone, badly hum-modulated.
- 5—Poor sinewave, badly hum-modulated.
- 6—Good sinewave, pronounced hum modulation.
- 7—Good sinewave, definite hum modulation.
- 8—Excellent sinewave, just perceptible hum modulation.
- 9—Perfect sinewave.

The "tone" scale is used for reporting the amount of hum on a CW signal. If the signal has chirp, the letter "C" can be appended. If the signal has key-clicks, the letter "K" can be appended. Most of the signals you hear will be T9.

is good. Few buildings erected prior to 1955 can be regarded as category A.

"B" Reinforced buildings of good workmanship and with sound mortar, but not designed in detail to resist lateral forces.

"C" Buildings of ordinary workmanship, with mortar of average quality. No extreme weakness, but neither designed nor reinforced to resist lateral forces.

"D" Buildings of low standards of workmanship, poor mortar or constructed of weak materials like mud brick and rammed earth. Weak horizontally.

Digital Modes are a facet of the hobby of great interest to some Amateurs, but remain an unexplored and misunderstood world to others, who perhaps expect it to be difficult and expensive to get involved, requiring extensive computer skills, and lacking in interesting live contacts with other Amateurs. This is however not true at all. Use of Digital Modes, particularly HF Digital Modes, for real-time contacts, has grown tremendously. Some of the modes developed in the last 10 years or so are now extremely popular for working DX, while other modes have advantages when working locals when conditions are poor—no need to suffer those static crashes. With low solar activity at present, Digital Modes take on a new importance, allowing QSOs to continue despite poor conditions.

VHF and UHF operation is mostly limited to packet operation, typically APRS (Automatic Position Reporting System). Bulletin board and message forwarding by radio has now largely been replaced by the internet. A new very high speed data and digital voice system called D*Star is beginning to be explored in some areas. There is also some interest in VHF SSTV, PSK-31, Hellschreiber, specialized Meteor Scatter, Aurora and moon-bounce modes, which offer considerable promise. Influenced by the internet, VHF packet activity has dropped markedly in recent years, but the HF digital “chat” modes are more popular than ever.

Digital modes make use of some type of keying or modulation to send data as “0”s and “1”s. For example, RTTY uses Frequency Shift Keying (FSK), sending “0”s on one frequency, and “1”s on another, with the elements arranged as five sequential data bits per character along with others for synchronizing the receiver. Morse and Hellschreiber send dots as carrier, and gaps between dots as no carrier. PSK31 sends “0”s and “1”s by switching the carrier phase, which you can imagine is the same as interchanging the leads to the antenna at the data rate. New chat modes such as DominoEX offer a considerable performance enhancement for VHF as well as HF.

Most digital modes use a coding system, which means that the letters and numbers (or even voice sounds or picture colours) are represented by numbers,

which are transmitted as “0”s and “1”s. This improves the efficiency, but reduces the resistance to errors. RTTY (which uses the CCITT International Alphabet ITA2), PSK-31 (which uses the G3PLX Varicode), Pactor (which uses ASCII, also known as ITA5) and digital voice (for example DRM, which uses a compression algorithm) are examples of coded modes. FAX, SSTV, and Hellschreiber are examples of uncoded modes.

Many of the newer modes use an error correction system to ensure that the data arrives intact despite problems in the propagation path. This error correction takes one of two forms: Automatic Repeat (ARQ) or Forward Error Correction (FEC). These techniques have different merits, so some modes use a combination of FEC and ARQ.

ARQ requires a two-directional link, where each “packet” or block of data received is checked for errors and a request for repeat transmitted back if necessary. These modes are characterised by alternate transmissions from each end of the link; they are not suited to broadcast or net operation, and can be difficult to monitor, because you have no opportunity to receive corrections, and may get multiple transmissions when one of the linked stations has data to repeat. Pactor, Digital SSTV, RFSM8000 (Mil Std 188-110B) and VHF Packet use ARQ techniques. Provided conditions are good enough for the link to operate, the data transmitted via ARQ will always be perfectly received—eventually. When conditions are poor, throughput drops off dramatically.

There are several types of FEC, using a simple systematic repetition, complex mathematical algorithms or massive redundancy. FEC has the advantage that the information required to reconstruct the data accurately is transmitted along with the data, so is available to all receivers, while the data rate is constant, and no repeats are required. This is better for net operation. Some FEC types are extremely robust, but no FEC system can alone provide guaranteed perfect copy. Another disadvantage of FEC is that there is some coding delay at the transmitter, and decoding delay at the receiver; as a result, there can be unacceptable delays before print appears at the receiver. MFSK16, MT63, Olivia, the weak signal mode MEPTJT and the new THOR mode are examples of FEC modes.

Uncoded modes do not need or use error correction, as they are generally robust by nature; in other words an error is seen as a blemish, rather than a completely different image, character or sound. These modes rely on powerful human pattern recognition ability for reception. Uncoded modes have an elegant simplicity and are generally characterized by the ability to send “overs” as short as just one character. The classic examples are the uncoded Morse and Hellschreiber, but some coded modes such as DominoEX are also sufficiently robust to not require error correction.

Digital mode software

Most of the Digital Modes discussed here can be operated with nothing more than a PC with a sound card, with very high performance. The sound card is used to send and receive audio tones which are used with an SSB transceiver. Reference(1) is arguably the best available guide to PC Digital Modes. A Guide to Sound Card Digital Modes with links to the software is also available on the Call Book CD, along with a presentation on HF Digital Modes.(2) The best way to locate the software mentioned in this review is via an Internet search engine, as web sites change frequently.

Other modes, such as Pactor and VHF packet, typically require an external module: either a modem or a modem and controller combination. There are now programs which emulate the modem and controller in software using the sound card.

Baud, bps and wpm

The symbol rate (baud) of a digital transmission is the rate in Hz at which the most basic data symbols are switched on the transmitted signal. For example, Amateur RTTY operates at 45.45 baud. The bit rate, in Bits Per Second (bps), is the actual data rate entering or leaving the modem (or sound card emulating a modem). For various reasons (compression, use of multiple carriers etc.) the bit rate may well exceed the baud rate. For example, MT63 has 64 carriers, and achieves 640 bps at only 10 baud.

The text transmission rate or typing speed in Words Per Minute (wpm) depends on how many bits there are per character (there are on average six characters in each English word, including a word space). As examples, 45.45 baud

RTTY is 45.45 bps, and since there are 7.5 bits per character, RTTY operates at 6 characters/sec or 60 wpm. PSK-31 operates at 31.25 baud and achieves about 50 wpm. DominoEX11, an MFSK mode, operates at only 10.7666 baud using 18 tones, and yet achieves about 62 wpm. Feld-Hell operates at 122.5 baud, uses up to 49 bits per character, and is capable of about 25 wpm.

The use of FEC also influences the relationship between raw bit rate and typing speed, always slowing the typing speed compared with operating without FEC. This difference is called the FEC rate. To use the previous example, MT63 operates at 640 bps, but achieves only 100 wpm due to heavy FEC with a rate of 0.1.

Techniques which vary the size of each character (for example variable sized codes, “varicodes”, or proportional fonts) can speed up the text speed for a given baud rate, and the actual speed then depends on context, just as it does in speech.

Bandwidth and speed efficiency

It is important to realize that some modes use much more bandwidth than others, often (but not always) in order to provide some other advantage. For example, compare PSK31 (bandwidth 50 Hz, speed 50 wpm) with MT63-500 (bandwidth 500 Hz, speed 50 wpm). MT63 uses much more bandwidth, and is less sensitive, but because it transmits much redundant information using FEC, is much more difficult to jam.

Some modes are poorly designed, having inappropriate modems, or use excessive bandwidth with no compensating advantages. Modes to avoid in this respect include HF packet, Olivia and RTTY (on lower HF). Other modes use too little bandwidth, or an unfortunate choice of keying rate, and so suffer from various ionospheric distortion problems. Some modes have very heavy FEC and other coding which considerably reduces the typing speed. For example Olivia operates at only 23 wpm, despite wide bandwidth, and has excessive delay. Most of the modes described below are well designed to have appropriate bandwidth and good efficiency. Advantages and any deficiencies are highlighted.

RTTY

The first digital mode to see widespread use in Amateur circles (after Morse, that is),

RTTY (Radio TeleTYpe) is a conversational or "chat" mode, and uses the ITA2 code to send a limited text alphabet, using frequency shift keying. Two tones are used, 170 Hz apart for Amateur applications. The transmission is about 450 Hz wide. Most Amateur operation is at 45.45 baud, while commercial services tend to be 50 or 75 baud. RTTY was designed for land-line use with mechanical machines, was never intended for DX radio operation, and suffers badly from multi-path effects. One lightning crash can cause a whole line of text to print in error.

RTTY still has a modest following, especially among mechanical machine enthusiasts, and it is still used for some contests. Perhaps the nicest sound card RTTY programs are TrueTTY by Sergei UA9OSV and MMTTY by Mako JE3HHT. Both have excellent tuning indicators and all the features one needs for simple yet slick conversations and even contests. MMTTY is more complex, but more versatile. MIXW by Nick UT2UZ and Denis UU9JDR is an excellent multi-mode alternative. For LINUX, OS-X, FreeBSD or Windows, the new free multi-mode program FLDIGI by Dave W1HKJ is highly recommended.

PSK-31

PSK-31 was developed by Peter Martinez G3PLX as an RTTY replacement, and was the first Amateur "designer" mode. It is a slick keyboard "chat" mode, but is much more sensitive and robust than RTTY, and uses less bandwidth than almost any other mode. PSK-31 uses differential phase shift keying (BPSK or QPSK). Just one tone is used. In BPSK mode the data is transmitted without error correction, while in QPSK mode each symbol represents two bits, allowing an FEC error correction technique to operate. The bandwidth is a mere 60 Hz. On HF, the error correction is disappointing, and PSK-31 is generally operated on HF without error correction. PSK-31 is very popular, is still the most popular digital mode, and has proved to be excellent for HF and VHF DX, despite reception errors. It is not well suited to trans-polar or trans-equatorial paths (such as long path to Europe) or short F-layer paths, as it is susceptible to ionospheric flutter due to the narrow bandwidth. It copes well with adjacent signals, fading and multi-path reception, and it is not unusual to work stations you can barely hear, even with several others in the receiver passband. Tuning is easy because even

weak signals can be seen on the software tuning display. Because of the sensitivity, low power is all that is needed. There is a wide range of PC software for PSK-31. A good program to get started with is DIGIPAN, conceived by Skip K6TY for use with QRP "PSK Warblers", dedicated crystal controlled PSK transceivers. MIXW and MultiPSK by Patrick F6CTE are also popular, FLDIGI by Dave W1HKJ is an excellent choice for all popular operating systems.

MFSK16

Developed by Murray ZLIBPU specifically for Long Path DX, MFSK16 has a most unusual and recognisable musical sound. It uses 16 tones, transmitted one at a time at 15.625 baud. It is significantly better for polar and long path DX than PSK31, as it is immune to polar Doppler effects, and has high multi-path resistance. It is also a very sensitive mode, and has also been found very effective for 80 m DX. The only trouble is that the tuning requirements are quite tough—the receiver needs to be within 4 Hz of the right frequency to receive, and drift must be less than 4 Hz per over. Since most modern transceivers easily meet these requirements, MFSK16 is quite popular for DX and regular rag chewing.

MFSK utilises special DSP techniques to enhance the performance and avoid ionospheric difficulties. With multiple tones, it is possible to achieve sensitivity not possible with RTTY, and also transmit more data per tone (four bits) than a two-tone or PSK system (one bit). This allows the baud rate to be reduced to counter multi-path effects, which are baud rate dependent. MFSK16 has strong Forward Error Correction, and achieves a typing speed of 40 wpm in a bandwidth of 315 Hz. Many programs are available for MFSK16. The original STREAM by Nino IZ8BLY is highly recommended, as is MIXW, by Nick UT2UZ and Denis UU9JDR, and MultiPSK by Patrick F6CTE. FLDIGI by Dave W1HKJ has versions for Windows, LINUX, OS-X and FreeBSD. All four of these multi-mode programs also offer a narrow-band picture transmission mode controlled by MFSK16.

DominoEX

This new mode was developed to provide high performance under Near Vertical Incidence Signals (NVIS) conditions, such as those on 80 m at night. This type of propagation is characterized by

high angle F-layer refraction from the ionosphere, with deep fading and severe propagation delays. Most digital modes do not work at all well under these conditions. The mode was also intended to be as good as MFSK16 under DX operating conditions, and should be used in preference when a suitable range of software is available.

New Zealand is an ideal country for digital mode development, and has seen many innovations in the past. DominoEX is (like MFSK16, Sequential MT-Hell and PSK-Hell) a New Zealand invention, and was designed and developed here by Murray ZLIBPU and Con ZL2AFP. DominoEX uses a series of important new developments to improve the performance of MFSK. A special tone management algorithm ensures that the signal spreading caused by multi-path cannot affect reception; differential frequency coding is used, which eliminates frequency drift and offset problems and "spreads" interference at the receiver to minimize its effect; and a special "nibble varicode" provides highly efficient character coding. There are several other innovations in this new mode, which is very simple to use. It has a synchronous tuning display which allows the signal to be seen clearly and tuned in even when very weak; it has a full extended ASCII character set which allows transmission of files and accented characters; and an extra "secondary" character set which sends pre-defined data when the transmission is otherwise idle. This data is displayed in a separate receive window. This facility has many uses, the most obvious being to provide full-time automatic ID of each transmission.

DominoEX does not require high power, and works well on 80m even when there is a lot of static, or evening multi-path reception. It is an ideal mode for low power portable or emergency use. DominoEX is very robust without requiring FEC, although an FEC option is offered for when near-perfect reception is important. Six speeds are provided, so the speed can be changed to suit conditions. The default 11 baud mode suits evening and daytime conditions, and operates at 62 wpm, faster than most people can type. Early evening and low power suit using the 8 baud mode, at 50 wpm. FLDIGI by Dave W1HKJ has DominoEX and is available in versions for Windows, LINUX, OS-X and FreeBSD.

THOR

This new mode from Dave W1HJK

is a cross between DominoEX and MFSK16, and has the benefits of both. It uses the differential frequency coding and 18 tones of DominoEX, along with a secondary text capability. It uses an extended MFSK16 binary varicode alphabet, allowing the use of control characters to support the HF ARQ protocol developed by Paul K9PS. The FEC is the same robust convolutional coder developed for NASA and used in MFSK16. This mode has the same symbol rates as DominoEX (but half the typing speed), is very effective in the presence of multi-path propagation, and as the name implies, this mode is extremely robust, especially in the presence of lightning noise. It is available in FLDIGI by Dave W1HKJ, which also provides ARQ operation with mail clients.

MT63

MT63 is an amazing mode that would not have been possible without Digital Signal Processing. Developed by Pawel SP9VRC purely as an academic challenge, in this mode 64 PSK carriers are transmitted at once, each one carrying a different part of the transmitted signal. The data (which includes strong FEC) is spread across the width of the signal, and also spread in time, so MT63 is resistant to both time and frequency related interference. MT63 is very tolerant of poor operating conditions and interference. Unfortunately the signal is rather wide for a digital mode (typically 1 kHz), and very aggressive (causes interference but is not much affected by interference), so needs to be used with care. MT63 is an excellent mode for transmitting bulletins or leaving messages on unattended computers. Users often think that MT63 is very sensitive—this is not in fact the case—it just seems so, because the signal sounds like noise and looks like noise on the tuning display, and because it has such good error correction. The MT63 software by Nino IZ8BLY is simple to use, easy to tune, locks on to the signal effortlessly, and is extremely robust. It is very sensitive, and excellent for DX under poor conditions. The MIXW version is even better, with higher sensitivity and better tuning tolerance. There is also a very good version of MT63 for LINUX in gMFSK by Tomi OH2BNS, and for all operating systems in FLDIGI by Dave W1HJK.

Olivia

Developed recently by Pawel SP9VRC, this mode is a marriage of MFSK transmission with the

highly redundant FEC used with MT63. Unfortunately the typing speed is very slow, there is a long delay between transmission and reception, and the bandwidth rather wide. The performance in terms of sensitivity and interference rejection is similar to MT63, and the mode enjoys good drift and tuning tolerance.

The most widely used version uses 32 tones in 1 kHz bandwidth, but there is a wide number of very confusing and non-compatible variations, difficult to tell apart, and differing in bandwidth, baud rate and number of tones. There are add-ons for these modes in MIXW, and Olivia is offered in MultiPSK and FLDIGI.

Hellschreiber

This elegant mode almost became a lost art, but began an enthusiastic revival in the late 1990s thanks to the PC and sound card. Text and simple graphic symbols are transmitted uncoded, rather like sending the dots to a dot matrix printer. Because the signal has very high peak power compared with the average power, and is interpreted by eye rather than by electronics, the mode is very immune to impulse noise and requires little power. It is also immune to most ionospheric effects if tuned with care. Since tuning is broad, it is simple to use, ideal for HF and for satellite working.

Hellschreiber has a special appeal that occurs with no other mode except Morse; there is an immense "feel" that the operator has for the propagation of the arriving signal, and the uniquely recognisable "fist" (in this case "font") of the transmission, as well as the signal sound which changes with propagation. The user can choose any one of many fonts to transmit (even "Windows" fonts), although the original 1930s font is still the best. The data rate, typically 122.5 baud, provides a good 25-30 wpm typing speed, depending on the font used. Big black fonts are best for DX, but tend to be slower.

The most commonly used mode is Feld-Hell, an on-off keyed CW radio mode which dates from the 1940s and predates RTTY. Invented by Rudolf Hell, Feld-Hell uses a single 980 Hz keyed tone. It is an ideal mode for 20 m, and performs well on other bands, even 80 m, satellites and moon-bounce.

The most sensitive Hell modes are PSK-Hell and FM-Hell, invented by Murray ZL1BPU and Nino IZ8BLY. These modes transmit the dots as phase reversals. These are excellent DX modes, very sensitive and (FM-Hell especially) not affected by ionospheric flutter

in the way PSK-31 is. FM-Hell uses MSK modulation, and does not require a linear transmitter. The HELL80 mode is a Hell original from the 1970s. It operates at 245 baud using FSK, does not require a linear transmitter, and works well on 80m.

The best Hell software is IZ8BLY Hellschreiber by Nino IZ8BLY. It operates multiple modes, includes a very good tuning display, and is really simple to install and use. MIXW, MultiPSK and FLDIGI offer most of these modes, and there are other versions for LINUX (gMFSK) and MacOS (Cocoamodem).

Fax and SSTV

These modes can also be operated with nothing more than a PC with sound card. Fax is very rarely transmitted on Amateur bands, although there is some interest in receiving weather maps on HF (black and white) and weather satellite images (grey scale) on VHF. Both of these modes are straightforward with software like Christian Bock's WXSAT program. The resolution produced by this software is incredible. On satellite pictures it is often possible to identify the South Island lakes, the Waikato River, and puffs of steam from White Island.

SSTV is a great way to share photographs, graphics and simple drawings with friends. The resolution is not very high, but the colour depth is good and the image content is restricted only by imagination and good taste. Much the best program to start with is MMSSTV by Mako JE3HHT. It helps if you have a scanner, digital camera or a good collection of digital images to send. SSTV is typically used to add interest to an SSB contact, and is also used on VHF FM, where picture quality is excellent. There are VHF SSTV nets in several parts of the country from time to time.

A new medium scan narrow-band TV system by Con ZL2AFP offers picture transmission as fast as one frame per second, although resolution is more limited than SSTV. Two of the most popular modes are 48 x 48 pixel RGB colour (3 seconds/frame) and 96 x 72 pixel compressed RGGB colour (4.5 seconds/frame), although there are several others, including faster black and white versions. The NBTv system was designed for use on 80m and is reasonably robust.

The new system uses a remarkable OFDM FM modulation system, where each line of the picture is sent on a separate carrier. There is no sync transmitted, none required at the receiver, and so

the transmission is efficient and reception not as prone to noise as conventional TV. The software can transmit AVI (movie) files, still and moving images, and can even use web cameras, digital and TV cameras and TV receiver cards. At the receiver, frames can be averaged to reduce noise, and transmissions can be saved and played back at a higher speed to restore true motion.

Digital SSTV and DRM

Digital SSTV is a recent development that can be experienced if your computer has enough power. The sound card modem used is based on that designed for DRM (see below), but restricted to 2.4 kHz bandwidth. Each block of data includes a checksum, and if the picture is received with some blocks incorrect, a semi-automatic process can request repeats of the missing blocks until perfect reception results. Picture quality is superb—identical to the original picture, and images of any size and resolution are accommodated. Transmissions are also identified by a header which includes the call-sign and image details.

The software tends to expect the user to be an expert, so find an experienced user to help you get started. Signals need to be strong and noise-free, with good propagation conditions for transmissions to be successful. HAMPAL by Erik VK4AES and DIGTRX by Roland PY4ZBZ are probably the easiest programs to use. The WINDRM modem used was designed by Cesco HB9TLK, and can also be used for fast file transfer.

Digital Radio Mondiale (DRM) is a new wideband digital mode intended for MF and HF commercial broadcasting. Reception quality can be very good, with low distortion, and often in stereo, although few stations are receivable in New Zealand at present. The modem uses sophisticated compression techniques, combining amplitude and phase modulation, allowing high sampling rates to be accommodated in 10 kHz bandwidth. There are several different formats allowing for transmissions up to CD quality. The mode is quite immune to fading, and does not suffer from selective fading that causes so much distortion on AM short wave broadcasting. A special receiver is required, but it is possible to receive DRM with a PC using the free DREAM DRM software by Volker Fischer, which works with a 12 kHz IF input to the sound card. A conventional receiver have an adaptor added

to provide the 12 kHz output. The software also receives AM, SSB and FM, with very good quality. DRM can be transmitted using the same software, and has been demonstrated on 80 m by ZL1WTT using an adaptation of a digital phasing exciter designed by WITAG. High power is required for reasonable transmission range, and the transmitter linear amplifier must have very low distortion, and these conflicting factors makes this mode quite a challenge.

PACTOR

A cross between Packet and AMTOR, PACTOR is a commercial and proprietary FSK system which provides strong error detection and ASCII text with an ARQ format. Efficiency is improved by a clever system where repeated damaged blocks of data are averaged until the check-sum is met, so a complete error-free block is not actually required for correct reception. Many of the newer HF multimode controllers offer PACTOR, and there are some applications for PC or other processor and external modem. PC sound card receive-only programs are available, but like AMTOR, no PC sound card software offers full capability. Pactor operates at 100 or 200 baud, and switches between speeds as conditions permit. There are more recent versions (PACTOR2 and PACTOR3), which offer even better performance, but require expensive commercial hardware.

PACTOR is popular for bulletin board use, and it is rare now to have a conventional contact using PACTOR. There are many Bulletin Board Stations (BBS) available on HF, some with connections to the Amateur Packet network, some with internet connection for mail forwarding. PACTOR is also widely used commercially. The WINLINK stations, for example, are fixed mail store-and-forward stations based around the world, with connection to the internet. Each station has a frequency list that it scans every few seconds. These frequencies are mostly on 40, 30, and 20 m. These stations provide a service to marine and other registered mobile or portable operators, who call on one of the published frequencies. Once connected, the BBS controls operation just like a Packet system.

LF and QRP Modes

Some modes are especially suited to weak signal operation, especially where the data rate can be very low, such as for beacons and for LF operation. Various types of Morse transmission

are widely used, at a low speed (QRS) or very low keying speed (QRSS) that is read visually. One of the most popular ways to receive these modes is to use a Spectrogram such as ARGO by Alberto I2PHD, which was designed specifically for Morse modes such as QRSS3 (3-second dots) down to QRSS120 (two minute dots).

Often the Morse is keyed using an FSK technique which allows the dots and dashes to be the same length and eliminates the need for spaces between elements, speeding up the transmission rate. These modes can also work well for HF beacons and QRP operation. Hellschreiber modes are also popular for QRP, in part because the average power is much less than the peak power, an important factor in portable operation.

A new propagation monitoring system conceived by Murray ZL1BPU and realized by Joe K1JT has been breaking new records for QRP reception distance. Not only have 50mW signals on 30m been copied around the world with some regularity, but the mode has been successfully used for moon-bounce using 100W amplifiers and simple 4-element beams! The new mode is MEPT_JT, and is operated in a similar manner to the QRSS weak signal modes.

Each message takes two minutes to transmit, and contains only callsign, location and transmitted power information. The transmission uses slow MFSK, and is only 6Hz wide. The WSPR software by Joe K1JT has numerous enhancements, such as copying multiple stations at once, and automatically posting correctly received 'spots' on an internet database. The system is used on all bands and about 20,000 spots are posted each day from around the world!

A system called PSKSounder by Con ZL2AFP can be used to measure signal propagation on any band. It has better resolution, narrower bandwidth (2.4kHz) and much better sensitivity than previous 'radar' style techniques. It has been used successfully to measure propagation paths on 30m between ZL and VK6 using just 1W. Propagation delay from one station to another can be

measured in real time with a resolution of 500us and a range of 15ms, making it ideal for measuring NVIS propagation. If the ground wave signal is available, absolute transmission time for each path can be measured.

Two separate programs are provided – a transmitter, run by one station, and a receiver, operated by others. The transmitter uses 2000 baud PSK, based on the STANAG 4285 modem. In addition to a repeated pseudo-random timing sequence, the transmitter sends a simple 'payload', typically the user's callsign and location. The receiver uses cross-correlation to locate the pseudo-random sequence and therefore can time and display the various paths over which the signal is received.

Operating frequencies

Narrow band modes (RTTY, PSK31) are to be found at the lower end of the digital allocation on each Amateur band, for example on 20 m from 14.070 to 14.099 MHz. Wider modes are found at the upper end of the allocation, for example on 20 m from 14.101 to 14.130 MHz. On 20 m the modes tend to be segregated to some extent, PSK31 at around

14.070 MHz, then Hellschreiber and other less used modes near 14.075 MHz, followed by MFSK16 and other narrow up to 14.080 MHz, where RTTY prevails. Wideband modes such as MT63 and Olivia are found around 14.109-114 MHz, with SSTV and digital SSTV around 14.230 MHz since they are used in conjunction with voice.

A ZL Digital Modes net operates on Friday evenings on 3560 kHz LSB, from around 8:30 pm. All modes are demonstrated and discussed, and newcomers are very welcome to join in and experience the different modes. The net is the perfect place for assistance in setting up, and for asking questions about Digital Mode operation. Some digital modes operators listen on this frequency every evening, and there are Morse and DominoEX nets on other evenings.

The operating frequency for most digital mode operation is

usually quoted as the frequency the transmitter emits when idle, which in some modes can be measured with a frequency counter. For RTTY this is the mark frequency. For Morse, PSK31 and Hellschreiber, it is the carrier frequency. MFSK16, MT-Hell and DominoEX signals are quoted from the lowest tone frequency. However, for complex modes like MT63, Olivia and SSTV, the frequency quoted is usually that indicated on the transceiver display in USB, since the tones transmitted and the sideband used are fixed by convention.

Most digital mode operation follows the USB-LSB convention used for SSB (LSB below 9MHz, USB above, with now a noticeable trend towards USB on all bands). The exception is RTTY, which for no good reason is always operated in LSB. Some modes (Morse, PSK31, Hellschreiber, AMTOR) can be copied equally well on either sideband. Commercial operation is almost always USB, and the quoted frequency is the transmission centre frequency.

Packet Radio

Packet radio utilises FSK and a protocol known as AX-25, which defines an automatic system to transmit blocks of information (called packets) which include the data, message type, information as to who the data is addressed to and sent from, and a robust error detection system called a Cyclic Redundancy Check (CRC).

Packet radio is organised so that many stations can operate on the same frequency with limited interference. This technique is called Carrier Sense Multiple Access/Collision Avoidance (CSMA/CA). This means that stations listen for other signals before transmitting to avoid collision, but cannot guarantee not to cause interference to stations that cannot be heard. This situation frequently happens when stations on opposite sides of town share a BBS station.

Most, but not all, packets require acknowledgement (an ACK), and the sender will repeat the packet until a correct acknowledgement is received. This technique ensures that the data is received correctly and compensates for collisions and errors, but as the

channel activity increases, the useful data rate slows down significantly, as more and more time is spent correcting and sending requests for repeats. There is a special family of unacknowledged messages, called an Unconnected Information (UI) packet, that is widely used for beacon messages and for the Automatic Position Reporting System (APRS) developed by Bob Bruniga WB4APR.⁽⁴⁾ The UI-View software by the late G4IDE is very popular for this application. APRS networks operate in most centres, either using a local data repeater or the APRS calling frequency, 144.575 MHz.

APRS is popular for tracking mobile stations equipped with GPS position location and equipment to automatically transmit the position, speed and heading of the vehicle. It is also remarkably effective for sending simple chat-type messages. The most common Packet format is 1200 baud AFSK using an FM transmitter. A device called a Terminal Node Controller (TNC) is generally used with a computer. The TNC contains both the packet controller and modem. The mobile APRS units only need to transmit, and so a small micro acts both as controller and modulator.

Most packet radio operation takes place on 2m and 70cm. Appropriate frequencies are listed elsewhere in the Call Book. Data repeaters, similar to voice repeaters, provide increased operating range. These are listed in the Call Book 'Repeaters and Beacons' section

References

All the software referred to is easily found by internet search by name or author. DominoEX, the Narrow Band TV and PSKSounder are available from www.qsl.net/zl1bpu/ZL2AFP.

^[1] Digital Modes for All Occasions, Murray Greenman ZL1BPU, published by the Radio Society of Great Britain, ISBN 1872309 82 8.

^[2] See Files folder on Call Book CD.

^[3] Install from Files folder on Call Book CD.

^[4] See www.aprs.net/.

NZART's PRIORITIES:

The interests of its TRANSMITTING MEMBERS, and, the access by RADIO AMATEURS to bands throughout the RADIO FREQUENCY SPECTRUM, by membership and active support of the INTERNATIONAL AMATEUR RADIO UNION.

DX CLUSTER NETWORK

by EDDIE OLSON ZL2AQY
GORDON STEWART ZL1ARN

The DX Cluster Network has become the most popular and exciting way for Ham Radio operators interested in DX'ing (working the world) to exchange DX-related information in real time. If you are a keen DX hunter, then this is the place for you to be.

For example, a DXer who has just worked a rare DX callsign, can post this information as a "spot" on the DX Cluster Network in real time, for the benefit of others who may wish to work this rare station. Or, if you are looking for a rare DX callsign you can monitor the "spots" posted by others on the Cluster network.

DX Cluster servers are linked to one or more other stations around the World who have installed the same or similar software. These nodes when

connected are called a cluster. Clusters are connected to other clusters, expanding the network. Individual users can connect to any one of these Networked Nodes by either Telnet, or local Packet Radio Ports. Users are capable of announcing DX spots and related announcements, sending personal talk messages, sending and receiving mail messages, searching and retrieving archived data, and accessing data from information databases, among many other useful features.

DX Cluster Nodes have extensive filtering rules for the User to choose from. This means you can view only 80m spots, or 40m spots, or CW spots only, or SSB spots only. This is particularly useful during Contests when you wish to see only specific 'spot' information. Filtering is

vital to limit the flow of data on slow 1200 Baud Radio Links.

These features and many others are already built in to a number of dedicated DX Cluster client programs available today. It is now possible to have total rig control from the DX Cluster client program.

The two DX Clusters currently operating in New Zealand are up to date with the latest software versions and offer all of these features plus many more.

Connecting to a DX Cluster Node

The two methods of connecting to a DX Cluster Network Node are Telnet via the Internet using a Telnet client program, and Packet radio via the Global Packet Radio Network.

Internet connection to ZL2AQY-10 is "Telnet:olson.net.nz" and Port 9000

Internet connection to ZL2ARN-10 is "Telnet:zl2arn.ath.cx" and Port 7300

Both ZL2AQY and ZL2ARN are "ported" to the National and Global Packet Network via the Xouter software. You will find Netrom entries AKDXC for ZL2AQY-10 and ZL2DXC for ZL2ARN-10. These entries will give you direct access to the respective Clusters.

If you are a keen Dxeer on any band including VHF/UHF/SHF, then the DX Cluster Network is the place to be for up to date information and news on who is doing what and where and when.

Eddie Olson ZL2AQY
Gordon Stewart ZL2ARN

AMATEUR RADIO RECORDS

NEW ZEALAND VHF/UHF/SHF RECORDS 2010

| Band | Frequency | Type | Stations | Date (DMY) | Mode | km | Prop | NOTES: |
|--------|------------|--------|-------------------|------------|--------|-------|------|--|
| 6 m | 50 MHz | O/seas | ZL3VTV/1-EH7KW | 03/04/01 | SSB | 19921 | F2 | 1 NZ 70 cm band has now been reduced from 420-450 MHz to 430-440 MHz. The TV Record of 31/01/1982 on 425 MHz lists as a 70 cm Record. |
| 6 m | 50 MHz | O/seas | ZL3JT-N6XQ | 04/03/01 | PSK31 | 14268 | F2 | |
| 6 m | 50 MHz | EME | ZL2BGJ-WA4NJP | 08/09/88 | CW | 13256 | EME | |
| 6 m | 50 MHz | EME | ZL3NW-F6FHP | 03/03/06 | JT65A | 19441 | EME | 2 NZ 13 cm band has now been reduced from 2300-2450 MHz to 2396 MHz-2450 MHz. The Records of 31/01/1982 and 18/10/1987 list as 13 cm Records. This band now known as 12 cm band. |
| 2 m | 144 MHz | Int. | ZL2ARW/p-ZL1BJB/p | 03/02/82 | SSB | 1069 | TD | |
| 2 m | 144 MHz | O/seas | ZL1CN-VK4DMC | 29/12/07 | SSB | 3549 | TD | |
| 2 m | 144 MHz | O/seas | ZL1BT-VK7MO | 04/01/07 | JT65 | 2443 | TD | 3 NZ 50 cm band has now been reduced and changed from 610-622 MHz to 614-622 MHz. The Record of 23/04/1988 lists as a 50 cm Record. |
| 2 m | 144 MHz | Int. | ZL1IU-ZL4LV | 28/10/05 | FSK441 | 1214 | MS | |
| 2 m | 144 MHz | EME | ZL3TY-EA5ZF | 19/06/05 | JT65B | 19242 | EME | |
| 2 m | 144 MHz | EME | ZL2BGJ-G3POI | 26/05/85 | CW | 18821 | EME | 4 /p means portable operation. |
| 70 cm | 432 MHz | Int. | ZL2ARW/p-ZL1BJB/p | 03/02/82 | SSB | 1069 | TD | |
| 70 cm | 432 MHz | O/seas | ZL1IU-VK7MO | 31/12/05 | SSB | 2432 | TD | |
| 70 cm | 432 MHz | EME | ZL3AAD-G3SEK | 12/03/89 | CW | 18970 | EME | 5 /# means operating in another state or district. |
| 70 cm | 432 MHz | EME | ZL2DX-HB9Q | 15/11/05 | JT65B | 18801 | EME | |
| 70 cm | 425 MHz | Int. | ZL2TWS/p-ZL2ASF/p | 31/01/82 | TV-VSB | 373 | LOS | |
| 50 cm | 610 MHz | Int. | ZL2UGR/p-ZL2AJI/p | 23/04/88 | SSB/FM | 302 | LOS | 6 Propagation Modes: Line Of Sight (LOS), Tropo Duct (TD), Tropo Scatter (TS) Meteor Scatter (MS), F2 layer and Earth Moon Earth (EME). |
| 32 cm | 925 MHz | Int. | ZL2TRV/p-ZL1TBG/p | 30/11/02 | NBFM | 620 | TS | |
| 23 cm | 1282 MHz | Int. | ZL2TV/p-ZL1TPH/p | 06/12/08 | TV-WFM | 159 | LOS | |
| 23 cm | 1296 MHz | Int. | ZL2ARW/p-ZL1THG/p | 30/01/82 | SSB | 687 | TD | 7 Sporadic E is a propagation mode that is difficult to verify and is therefore listed as a Tropo mode. |
| 23 cm | 1296 MHz | O/seas | ZL1AVZ-VK2FZ/4 | 30/11/95 | SSB | 2317 | TD | |
| 23 cm | 1296 MHz | EME | ZL3AAD-PA0SSB | 13/06/83 | CW | 18657 | EME | |
| 13 cm | 2304 MHz | Int. | ZL2ARW/p-ZL1THG/p | 31/01/82 | NBFM | 687 | TD | |
| 13 cm | 2304 MHz | EME | ZL2AQE-W3IWI/8 | 18/10/87 | CW | 13931 | EME | |
| 9 cm | 3456 MHz | Int. | ZL2AQE/p-ZL2ARW/p | 06/03/83 | NBFM | 547 | TD | |
| 5 cm | 5760 MHz | Int. | ZL2TV/P-ZL1TPH/P | 28/12/05 | SSB/CW | 485 | TS | |
| 5 cm | 5760 MHz | Int. | ZL1TPH/p-ZL1SWW | 03/09/06 | FSK441 | 48 | TS | |
| 5cm | 5760 MHz | EME | ZM2TV-JA8ERE | 24/04/10 | CW | 9461 | EME | |
| 5cm | 5760 MHz | EME | ZM2TV-W5LUA | 25/04/10 | SSB | 12027 | EME | |
| 3 cm | 10368 MHz | Int. | ZL1TPH/p-ZL2IP/p | 04/01/09 | SSB | 551 | TD | |
| 3 cm | 10368 MHz | EME | ZL1GSG/p-DJ7FJ | 12/03/97 | CW | 18340 | EME | |
| 3 cm | 10368 MHz | Int. | ZL1SWW-ZL1TPH/p | 03/09/06 | FSK441 | 48 | TS | |
| 1.2 cm | 24000 MHz | Int. | ZL1TPH/p-ZL2IP/p | 12/03/06 | SSB | 221 | TD | |
| 1.2 cm | 24000 MHz | Int. | ZL1TPH/p-ZL2IP/p | 05/03/06 | SSB/CW | 169 | LOS | |
| 0.6 cm | 47000 MHz | Int. | ZL1TPH/p-ZL1AVZ/p | 01/05/05 | SSB | 47 | LOS | |
| 2.5 mm | 122280 MHz | Int. | ZL1TBG/p-ZL1TPH/p | 06/02/10 | NBFM | 0.3 | LOS | |

Operating Modes

Direct Connect

Where a repeater at one location (Node A) connects via the Internet with another repeater (Node B). With this type of link the two nodes or repeaters can be involved in the connection or resultant conversations. While repeaters "A" and "B" are connected, anyone attempting to connect with either node will be told by a recording that—"The node you are calling is currently connected to call-sign". All local traffic on each repeater will be heard on the other repeater as well.

Reflector Connection

A reflector is a computer that is not connected to any radio, it is connected to the internet allowing many repeaters to be inter-connected, redirecting received audio back to all other connected repeaters. At any given time there maybe 2 to 10 repeaters around the world interconnected via a Reflector.

With reflector use a gap of approximately 10 seconds must be left between transmissions, this allows:

- For the delays created by multiple Tone Squelch radios in the links between the repeater and IRLP link.
- users on other nodes a chance to check in.
- other nodes time to send touch-tone commands to drop their node.

Also allow a delay of approximately three second from the time pressing the PTT button at the start of a transmission.

With IRLP your transmission is now being heard on many repeaters around the world. To

ensure intentions are understood give your callsign (phonetically) along with your name and QTH of the repeater you are monitoring for a call. Mobile listeners may only pick out your prefix, your name or QTH.

When calling a station state your intentions by always identifying whom your call is meant for.

Example: Several stations including a DX station complete a QSO and you wish to contact the DX station. Action: VK3xxx this is Mike ZL3TMB in Christchurch New Zealand. By doing this rather than just using your call-sign you leave no question whom you wish to contact.

Making a direct connection

Listen on your local machine for 15-30 seconds before transmitting, ask if the repeater is currently in use. If all is clear, identify yourself and give the node name or number you wish to call. Example: "ZL3TMB connecting to the Sydney node"—then enter the ON code for the node (node number then a 0) and release your PTT. Your local repeater will transmit carrier for a few seconds while waiting for the connection to be authenticated. Connections are confirmed with the transmission of the voice ID of the destination node and your node's voice ID on the destination repeater.

If your node is already connected to another node or reflector the greeting "your node is currently connected to ID of the connection" is played. In this case confirm if anyone desires the connection before closing it using the OFF code (node number then a 1 or just dial 73).

Once connected wait at least

15 seconds before transmitting because:

- The repeater may be in use, and your entry may have occurred between transmissions.
- The voice ID of your node is longer than the voice ID of their node, and the connection is not made until the ID is fully played.
- Their node computer may be slower, and hence take longer to process the connection than yours.

Press and hold the microphone PTT for a second and then announce your presence and your intention such as you are calling someone specifically or just looking for a QSO with another ham in that city.

If no response is heard, announce your call and your intent to close the connection then key in the OFF code (node number then a 1 or just 73). This a normal courtesy and a regulatory issue in some countries who may be connected to the reflector.

Some nodes are configured so you cannot connect to them if that repeater is active and the message "The node you are calling is being used locally" will be heard. If your repeater is inactive for 4 minutes the connection will automatically close transmitting a voice ID disconnect message on both nodes.

Connecting to a reflector

Listen to your local repeater for local use and then announce your intention to use the Reflector and send the ON command. When you hear the confirmation ID always WAIT at least 15 seconds before transmitting as you are most likely now connected with many repeaters and a QSO could be in

progress. If after 15 seconds you hear nothing, identify yourself and indicate you are listening to the Reflector from "City and Country". As your local repeater possibly now has world-wide coverage include your QTH. Connections to the reflectors time out with no activity however many node owners set this to a long period so it is not unusual for repeaters with minimal traffic to stay connected to the Reflector for extended periods. When a node times out from a Reflector the message "Activity time out ... Reflector xxx, link off" will be played.

If you hear or wish to engage in a prolonged rag-chew on your local repeater out of courtesy to other node listeners drop the reflector.

Error messages

From time-to-time you may receive connection error messages, common ones are:

"The node you are calling is not responding, please try again later", caused by a loss of internet connectivity to one end of the call attempt.

"BEEP Error—The call attempt has timed out, the connection has been lost", occurs when a node is OFF-LINE, or there may be temporary net or node problems.

"The Connection Has Been Lost", the internet connection has dropped.

If you are new to IRLP you should always consult with your local node sponsor to confirm the local guidelines on reflector connections in your area.

The latest node numbers can be obtained direct from the IRLP website <<http://status.irlp.net/>>.

New Zealand IRLP Nodes

as per <http://status.irlp.net> August 2010

| Node ID | Call-sign | Location | Frequency | CTCSS |
|---------|-----------|------------------|-----------|-------|
| 6095 | ZL1AM | Whangarei | 438.7000 | None |
| 6950 | ZL1BQ | Auckland | 146.7000 | None |
| 6549 | ZL1IS | Waikato Repeater | 146.9500 | None |
| 6609 | ZL1KIWI | Hamilton | 144.7000 | 88.5 |
| 6394 | ZL1KW | Kawerau | 147.0000 | None |
| 6105 | ZL2AA | Gisborne | 146.8000 | None |
| 6793 | ZL2AS | Hastings | 147.2500 | None |
| 6943 | ZL2KO | Feilding | 147.1250 | None |
| 6285 | ZL2KS | Blenheim | 146.9500 | None |
| 6081 | ZL2KS | Blenheim | 438.4500 | 192.8 |
| 6910 | ZL2LD | Masterton | 147.1750 | None |
| 6501 | ZL2QS | Hastings | 432.7000 | 123.0 |
| 6931 | ZL2VH | Upper Hutt | 147.3000 | None |
| 6900 | ZL3TMB | Christchurch | 145.625 | 88.5 |
| 6397 | ZL4AU | Invercargill | 146.4500 | None |
| 6184 | ZL4DM | Dunedin | 146.6500 | None |
| 6507 | ZL4JH | Dunedin | 147.4250 | None |
| 6642 | ZL4QS | Alexandra | 146.5250 | None |

International IRLP Nodes

as per <http://status.irlp.net>
August 2010

| Node ID | CallSign | Location |
|---------|----------|-----------------|
| 1000 | VE7RHS | Vancouver 2010 |
| 1003 | VE7ISC | Nanaimo |
| 1010 | VE7RHS | Vancouver 2010 |
| 1015 | VE7RNV | North Vancouver |
| 1020 | VE7RNA | Chernabynus |
| 1030 | VE7VIC | Victoria |
| 1041 | VE7BYN | Sicamous |
| 1050 | VE7RVN | Vernon (SIRG) |
| 1057 | VE7SML | Tatlayoko Lake |
| 1066 | VE4WRS | Winnipeg |
| 1068 | VE6HM | Edmonton |
| 1070 | VE7MFS | Coquitlam |
| 1073 | VE7RAD | Chilliwack |
| 1080 | VE7TSI | Kamloops |
| 1089 | VA6WY | Edmonton |
| 1120 | VE7KU | Port Alberni |
| 1126 | VE7RBH | Smithers |
| 1130 | VA7LPG | Nanose Bay |
| 1147 | VE7SQR | Squamish |

| Node ID | CallSign | Location |
|---------|----------|--------------------|
| 1148 | VE7GDH | Salt Spring Island |
| 1150 | VE7NUT | Summerland |
| 1160 | VE7RAP | Comox |
| 1164 | VE7PEN | Penticton |
| 1180 | VE7PQA | Parksville |
| 1188 | VE6RCM | Medicine Hat |
| 1190 | VE7UHF | Richmond |
| 1205 | VA4FIL | Winnipeg |
| 1207 | VE7BAS | Richmond |
| 1210 | VE7DQC | Prince Rupert |
| 1228 | VE7DIR | Vernon |
| 1250 | VE7FFF | Prince George |
| 1255 | KE5KAF | Laredo |
| 1260 | SARA | Province-wide |
| 1269 | VA7SCA | Vancouver |
| 1270 | VA6IRL | Lethbridge |
| 1301 | VE7EGO | Vernon |
| 1330 | VE5CMR | Saskatoon |
| 1340 | VE5BRC | The Battlefords |
| 1350 | VE5SKN | Saskatoon |
| 1353 | VE6QE | Red Deer |
| 1360 | VE5CC | Saskatoon |

| Node ID | CallSign | Location |
|---------|----------|--------------------------------|
| 1370 | VE5LAK | Prince Albert/Christopher Lake |
| 1375 | VE7DDT | Okanagan Falls |
| 1380 | VE5MLR | Meadow Lake |
| 1396 | VE7RPS | Vancouver |
| 1403 | VE7ICA | Langley |
| 1404 | VE3SPA | Pickering |
| 1408 | VE5WEY | Weyburn (The Opportunity City) |
| 1420 | VE7RAM | Tappen |
| 1450 | VA6SHS | Peace River |
| 1460 | VE6TSR | Grande Prairie EchoIRLP 509961 |
| 1461 | VE7RVA | Abbotsford / Chilliwack |
| 1463 | VE7RSC | Surrey |
| 1491 | VE7OGO | Kelowna |
| 1503 | VE7VCR | Chilliwack |
| 1547 | VA7MWR | Clinton Village |
| 1550 | VE5WM | Regina |
| 1553 | VE4KEY | Winnipeg |
| 1560 | VE7FFU | Terrace |
| 1570 | VE5SCR | Swift Current |
| 1590 | VE3TCR | Brantford |
| 1649 | VE7OVY | Victoria |
| 1660 | VE7CAP | Cranbrook |
| 1662 | VY1YC | Whitehorse |
| 1694 | VE7RPT | Vancouver |
| 1705 | VE7RST | Abbotsford |
| 1710 | VA5PAR | Yorkton - EchoIRLP #48431 |
| 1725 | VA6SVM | Olds |
| 1727 | VE7CUP | Houston |
| 1750 | VE4FFR | Flin Flon |
| 1755 | VE7BSM | Nanaimo |
| 1766 | VE5MBX | Martensville |
| 1807 | VE5LCM | Rocanville - EchoIRLP #425463 |
| 1809 | VE4WSC | Winnipeg |
| 1810 | VE6XZ | Calgary |
| 1811 | VE7EDA | Nakusp |
| 1840 | VA6JAC | Edson |
| 1849 | VE7MTY | Pitt Meadows-EchoIRLP #44463 |
| 1850 | VE6COM | Lethbridge EchoIRLP 2722 |
| 1858 | VE5MDM | Melville - EchoIRLP #342958 |
| 1860 | VE6JBJ | Airdrie |
| 1870 | VA6XG | Edmonton |
| 1882 | VE5PSC | Moose Jaw |
| 1888 | VE7JFB | Kamloops |
| 1909 | VE6RES | Edmonton |
| 1910 | VE7RMR | Maple Ridge - EchoIRLP #51910 |
| 1919 | VE6AFP | Edmonton |
| 1939 | VA4BOB | Flin Flon - EchoIRLP #418614 |
| 1946 | VE7EDA | New Denver |
| 1980 | VE7RSC | Surrey |
| 1981 | VE4PIN | Pinawa |
| 2000 | VA3LU | Thunder Bay |
| 2006 | VA2RMP | St. Jerome |
| 2009 | VE9SJN | Saint John - EchoIRLP #285237 |
| 2010 | VE7WHR | Whistler |
| 2015 | VE3JJA | Sioux Narrows |
| 2018 | VE2REH | Gatineau |
| 2020 | VE3ULR | Toronto |
| 2027 | VA3XRR | Ajax |
| 2030 | VE1CRA | Charlottetown |
| 2037 | VE3TBF | Haliburton |
| 2040 | VE2CRA | Ottawa |
| 2050 | VE1NSG | Halifax |
| 2053 | VE3IEV | Carp |
| 2060 | VE1WRC | Amherst |
| 2069 | VE3JOP | Vaughan |
| 2073 | VA3OFM | Gravenhurst |
| 2075 | VE3URU | Toronto |
| 2080 | VE1WN | Greenwood |
| 2088 | VE3FRG | Frontenac County |
| 2090 | VE3BIP | Belleville |
| 2100 | VE3ADT | Halton Hills |
| 2105 | VE2RXY | Le Bic |
| 2108 | VA3XFT | Toronto (downtown) |

| Node ID | CallSign | Location |
|---------|----------|---------------------------------|
| 2109 | VE1BHS | Sugarloaf |
| 2115 | VE3PRV | Hammond |
| 2120 | VA3RZS | Peterborough |
| 2121 | VE3PRC | Brampton |
| 2125 | VE2RAX | Quebec City |
| 2150 | VE1BAS | Oromocto |
| 2154 | VE3TTO | Hamilton |
| 2170 | VA3BBB | Windsor |
| 2176 | VE3OUR | Marmora |
| 2184 | VE3OHR | Ingersoll |
| 2195 | * | |
| 2200 | VE3OD | Georgetown |
| 2202 | VE3III | Windsor |
| 2203 | VE3MUS | Huntsville |
| 2210 | VE3TST | Ottawa |
| 2211 | VA2RUR | Saguenay (secteur La Baie) |
| 2236 | VE3KES | Edgar |
| 2238 | VE3PCD | Etobicoke |
| 2248 | VE3WCR | Niagara Region |
| 2255 | VE3WOM | Whitby |
| 2260 | VE3OVQ | Guelph |
| 2261 | VE3RAK | Toronto North |
| 2268 | VE1KEJ | Maitland Bridge (Keji Nat Park) |
| 2270 | VE3YYZ | Toronto (downtown) |
| 2271 | VE3NIB | Toronto (downtown) |
| 2275 | VE3KFR | Campbellford |
| 2280 | VA3UW | Almonte |
| 2290 | VE4PNO | Winnipeg |
| 2304 | VA3PMO | Mississauga |
| 2330 | VE3KD | Sault Ste. Marie |
| 2332 | VE2RAO | Gatineau |
| 2338 | VE3TCO | Simcoe |
| 2340 | VE2REA | Quebec city |
| 2363 | VE1CFR | Summerside |
| 2365 | VE3SRG | Sudbury |
| 2370 | VE1HAR | Truro - EchoIRLP 161248 |
| 2390 | VO1MST | Marystown |
| 2400 | VE3SUE | London |
| 2404 | VE3ERC | Elmira |
| 2405 | VE3SME | Simcoe (Norfolk County) |
| 2410 | VE3RBM | Kitchener |
| 2414 | VA3IGN | Ignace |
| 2439 | VE3LEX | Ajax |
| 2443 | VE3AZX | Cornwall |
| 2450 | VE3RAK | Toronto |
| 2460 | VE3MUS | Cottage Country Huntsville |
| 2480 | VE3RPL | Parry Sound |
| 2490 | VE3KR | Walker Lk Huntsville |
| 2509 | VE3BIK | Devlin (Fort Frances) |
| 2520 | VE3LKT | Pembroke |
| 2524 | VE3WHO | Sarnia |
| 2555 | VE3RJS | Campbellville |
| 2559 | VE9LNX | Dunlop |
| 2567 | VE3ZHR | Haliburton County |
| 2570 | VE2CSA | Laval |
| 2590 | VA3SLT | Sioux Lookout |
| 2594 | VE3SSF | PeterBorough |
| 2596 | VE3RIX | Ottawa |
| 2600 | VE3PGC | Cornwall |
| 2611 | VA3XT | Windsor |
| 2649 | VE3ERX | North Bay |
| 2650 | VA3OME | Omersee |
| 2651 | VA3PMO | Mississauga |
| 2680 | VE3RSB | Burlington |
| 2688 | VE3LSR | Barrie |
| 2700 | VE3ORX | Orangeville |
| 2710 | VE3TIV | Kincardine |
| 2718 | VA3OPG | BOLTON |
| 2736 | VO1CGR | Mount Pearl |
| 2739 | VA3DIS | Dryden |
| 2750 | VE3KBR | Kingsston |
| 2759 | VE3EOW | ARES / CANWARN |
| 2768 | VE3RIB | Atikokan |
| 2780 | VE9ZC | Fredericton |
| 2803 | * | |
| 2804 | VA3SDG | Cornwall UHF |
| 2805 | VE9TCR | Moncton |
| 2811 | VE3SVC | Cornwall VHF |
| 2820 | VE5NIP | Nipawin |

| Node ID | CallSign | Location |
|---------|----------|---------------------------------|
| 2843 | VE3FCG | Stratford |
| 2860 | VE3RQQ | Little Current |
| 2874 | VE3NMN | London |
| 2882 | VA3ERA | ERA System, Southern Ontario |
| 2889 | VA2ASC | St-Hubert |
| 2896 | VE3ZZZ | Leamington |
| 2897 | KE4TTE | Orlando |
| 2907 | VE2RWO | Rimouski, EQC |
| 2947 | VE3KJG | Lavant |
| 2948 | VE3AZJ | Cambridge [ILS] |
| 2949 | VE3YQK | Kenora |
| 2952 | VE1YAR | Yarmouth |
| 2972 | VE3EI | Niagara-on-the-Lake |
| 2973 | VE1KIN | Bridgewater |
| 2998 | VE3MIS | Mississauga |
| 3000 | AH6LE | Beavercreek, Wilsonville, Metr |
| 3003 | K7PFJ | Firestone |
| 3004 | N6DL | Coalinga |
| 3006 | AD7LQ | Grantsville |
| 3007 | KL3K | Anchorage |
| 3009 | * | |
| 3012 | AE6TV | Micro-Node Repeater, GT |
| 3013 | W6MV | Santa Barbara |
| 3014 | WA6NVL | Culver City |
| 3015 | N0SZ | Colorado |
| 3017 | WA6LA | Palos Verdes III [WALA] |
| 3018 | N5XWD | Houston |
| 3019 | KE7ULC | Mobile Node WinSystem Affiliate |
| 3024 | W6QNE | Bethel Island |
| 3025 | N7SZY | Kellogg |
| 3029 | K6BSC | Palm Desert |
| 3030 | K6VE | Los Angeles |
| 3031 | AG6AU | Pilot Peak WIN System/ Red Cros |
| 3033 | K7IOU | Tucson |
| 3034 | N7BFS-2 | Spokane |
| 3035 | N5XXO | Odessa |
| 3036 | W6CBS | San Carlos |
| 3037 | N50TY | Las Cruces |
| 3039 | W7RAT | Portland |
| 3040 | KB6THO | Pasadena |
| 3046 | K6CRS | Santa Clarita |
| 3050 | KB5KZS | Bartlesville |
| 3051 | KC6ORG | Perris ESPAÑOL |
| 3055 | AG0N | Scottsbluff |
| 3057 | W6CX | Mt. Diablo |
| 3058 | KK7ECV | Reno WINSystem Affiliate |
| 3059 | * | |
| 3062 | K7CPR | Hoquiam |
| 3064 | N7TGB | Reno |
| 3065 | KB7TEB | American Fork |
| 3066 | N5ZUA | Smithville - Saltgrass Link |
| 3067 | KF7BIG | Issaquah |
| 3069 | WA6AVR | Columbia |
| 3071 | KK7RV | Sierra Vista "OMIK" |
| 3073 | AL2B | Kenai |
| 3075 | KD6KAC | Gerlach |
| 3077 | K6JSI | Williams - Win System |
| 3078 | W7IHC | Salt Lake City |
| 3079 | N5GI-2 | Fairview |
| 3080 | KH6FV-2 | Honolulu |
| 3081 | W0EKR | Canon City |
| 3082 | N7ARR | Reno - Sparks NARRI |
| 3083 | WL7CWE | Anchorage |
| 3085 | K5FOY | Mountain Home |
| 3086 | KC7DMF | Eugene |
| 3088 | WB9STH | Las Vegas |
| 3089 | W7DUX | Sisters |
| 3090 | KB6JAG | Idyllwild - EchoLink#3091 |
| 3092 | AB0BW | Rochester Node |
| 3093 | WB5QHS | Lordsburg |
| 3097 | N5FAZ | El Paso |
| 3098 | W7AAE | Henderson |
| 3100 | WA6LVX | Bakersfield |
| 3101 | KC0QJZ | Mina Lake |
| 3102 | KC6TAC | Simi Valley |
| 3105 | NM7R | Chinook - WIN System Affiliate |
| 3106 | WOANM | Saint Michael |
| 3107 | WT9S | Tonopah |

| Node ID | CallSign | Location |
|---------|----------|--------------------------------|
| 3111 | K7MAV | PARADISE / LAS VEGAS |
| 3112 | KH6DQ | Honolulu |
| 3113 | K6IB | Fremont |
| 3114 | KE6DEL | Huntington Beach |
| 3115 | WB6NDJ | Oakland (EchoIRLP) |
| 3116 | N7ERT | Pendleton |
| 3117 | WA6MSN | Visalia |
| 3118 | KM0R | Midway |
| 3122 | W7JWC | Kennewick |
| 3124 | NA0US | Longmont |
| 3127 | W5AC | College Station |
| 3128 | KT6U | Upland |
| 3129 | KB6ZOP | Rohnert Park |
| 3130 | KC7BSA | Fruitland |
| 3132 | W7YC | Houston |
| 3133 | KA6DWN | CalNet-SiliconValley |
| 3134 | W7YC | Orlando |
| 3135 | K7MLA | Herriman |
| 3137 | W7YC | Tucker |
| 3139 | KB6Q | Nipomo Central Coast |
| 3141 | W6KGB | Oxnard |
| 3143 | WA6HWW | Grants Pass-WinSystemAffiliate |
| 3144 | W7UDI | Hobart |
| 3146 | W6RWN | Mission Hills |
| 3148 | WA0VJR | Las Vegas |
| 3149 | W6REB | Santa Cruz |
| 3150 | W6YJ | Southern California |
| 3151 | KM6D | Indio |
| 3152 | WD5IEH | Victoria |
| 3153 | K7UND | Springfield |
| 3156 | WB0OND | Hastings |
| 3157 | W6TUG | MOBILE |
| 3158 | N6UG | Roseville |
| 3159 | WB6SKS | Albany |
| 3160 | W6YJ | Oceanside |
| 3161 | W0RRZ | Grand Junction |
| 3163 | W5KGT | West Monroe |
| 3165 | K6SLs | Smith River WIN System |
| 3166 | W7HTL | Las Vegas-Solar Site-4855 |
| 3167 | KL3K | Willow MP 70 Parks Hwy. |
| 3170 | WD6AWP | Santiago Peak |
| 3172 | N6FR | Sacramento |
| 3173 | K6IB | Fremont |
| 3174 | WA5AOI | Omaha |
| 3175 | N9GDM | Conifer |
| 3176 | W6DVE | Fontana |
| 3177 | K6JSI | Yuma - WIN System |
| 3178 | K6KYA | Link |
| 3179 | KF6CHA | Santa Monica |
| 3180 | W6DRA | Palm Springs (Tram Repeater) |
| 3182 | W7JLC | Prescott |
| 3183 | WB6QAZ | Cloverdale |
| 3184 | K6IB | Fremont |
| 3188 | K70GM | Fish Haven - Bear Lake |
| 3190 | WD8CIK | Hollywood |
| 3192 | KE5PTZ | Conroe |
| 3193 | WB7ABP | Santa Rosa |
| 3194 | N7ARR | Las Vegas NARRI |
| 3196 | KH6DAD | Mililani |
| 3197 | KH6FV-4 | Kailua-Oahu |
| 3198 | WA5QYE | Enid |
| 3200 | AH6CP | Honolulu |
| 3203 | NL7R | Valdez |
| 3204 | KB6JAG | Hemet - EchoLink#416226 |
| 3206 | K6MFM | Walnut Creek |
| 3207 | WB6IAG | Paradise WinSystem Affiliate |
| 3208 | W6RCA | So. San Francisco |
| 3211 | W7DBA | Huntsville |
| 3212 | AH6SJ | Kailua-Kona |
| 3213 | KE5NAJ | Rockport |
| 3215 | K7MLA | Riverton |
| 3217 | KH6FV-6 | Pearl Harbor |
| 3219 | K6JSI | Willits - WIN System |
| 3221 | KA1MZY | Live Oak |
| 3223 | W7UPS | Kennewick (Tri-Cities) |
| 3225 | WA6UQZ | Lompoc II [WALA] |
| 3226 | WA6TUL | Santa Clarita |
| 3227 | N7JEH | Spring Creek - (Elko Area) |
| 3228 | W6WLS | Santa Cruz/Monterey Bay |

| Node ID | CallSign | Location | Node ID | CallSign | Location | Node ID | CallSign | Location | Node ID | CallSign | Location |
|---------|----------|------------------------------|---------|----------|--------------------------------|---------|----------|--------------------------------|---------|----------|--------------------------------|
| 3229 | W6RCA | Dixon | 3352 | W7SP | Provo/Salt Lake City | 3514 | K7SLT | Hayden | 3632 | W03B | North Las Vegas |
| 3231 | K7RPT | Lake Oswego | 3353 | AL7LE | Soldotna | 3515 | KK7AV | Kolossi Village | 3634 | KE7PG | Spokane Valley |
| 3234 | N6SPD | Monterey Bay & County [WALA] | 3354 | W9LEO | Maricopa | 3517 | N5ZUA | Alexandria - Saltgrass Link | 3635 | W5ICF | Sagemont |
| 3239 | N0PBA | Mankato | 3356 | W7JZU | Boise | 3518 | W9IKU | Green Bay | 3639 | W5LOS | Beeville |
| 3240 | KB7RSI | Las Vegas | 3358 | K6PNG | 1st WinSystem Affiliate | 3520 | WB6EGR | Las Vegas Valley/ NorthWest | 3640 | WA6VPL | Lompoc [6 Meters] |
| 3242 | W6MAV | Vacaville | 3362 | W7WAC | Big Water | 3521 | N5KJN | Pearland | 3646 | W7AOR | Las Vegas |
| 3243 | WD5MHZ | Greenwood | 3363 | KC7CUE | Eureka | 3522 | WB6WXO | Westminster | 3647 | N5XFW | Hot Springs |
| 3244 | N6EOC | San Carlos NOC | 3364 | K5VPW | Austin | 3526 | * | | 3648 | KE7UOR | Brookings |
| 3245 | K0HU | Humboldt | 3367 | W6YDD | Sacramento | 3527 | * | | 3650 | KE6PCV | Los Angeles - Calnet |
| 3246 | WB6KHP | San Jose | 3372 | KD7KMU | Laramie | 3529 | KC7LGT | Sequim Repeater | 3651 | KE6PCV | Los Angeles - Calnet |
| 3250 | N7BFS | Spokane | 3375 | KD6KXG | Loomis - North Sacramento | 3534 | KE5BR | Olathe | 3652 | AB7F | Vancouver |
| 3252 | W6JAM | TuJunga | 3376 | N7SGV | Clark County ARES | 3535 | N0SJK | Ogallala | 3653 | KI6IXQ | Costa Mesa |
| 3253 | KA6IYS | Weldon | 3377 | KD7ITP | Oroville | 3537 | KL3NP | Nome | 3654 | W7YC | Fort Worth |
| 3254 | WA2JM | Brinnon | 3381 | AC7O | Logan | 3538 | K6TEA | San Carlos | 3657 | N5SIM | Pharr |
| 3255 | KD7DMP | Spokane | 3382 | N5SKU | Richardson | 3539 | KE5FGY | Wimberly - DBL | 3659 | KE5BXF | Edinburg |
| 3257 | KK7EC | Okanogan | 3383 | W9PCI | Central Point & North Valleys | 3540 | K6IFR | Palm Springs | 3662 | K7IIV | Burien (mobile node) |
| 3258 | W0WVV | Hastings | 3387 | WA2PVV | Chatham | 3541 | W7CTH | Twin Falls | 3663 | KI6SEJ | Fremont |
| 3260 | N7ARR | Las Vegas NARRI | 3390 | WB2BQW | New Windsor | 3543 | KC7RJK | Eugene | 3664 | K6JRM | Ehrenberg-Win System Affiliate |
| 3261 | AL4K | Anchorage | 3392 | K06KD | Roseville/Citrus Heights | 3544 | KM6U | Orinda | 3666 | KL1IO | Valdez |
| 3262 | N7WMM | Donald | 3393 | N2GPD | Aliso Viejo | 3546 | KI4VLH | Micro-Node in RV | 3667 | WB6BDD | Pleasanton |
| 3263 | KB0LCR | Watertown | 3395 | KP4UZ | Las Vegas | 3547 | KC6AGL | Orange County, California | 3669 | XE2ALC | Puerto Peñasco |
| 3266 | KD0S | Pierre | 3396 | N7ARR | Tonopah NARRI | 3548 | AB0VX | Logan | 3671 | K6SA | Saratoga |
| 3267 | W7KOP | Provo | 3398 | N7VR | Billings | 3550 | AA7RP | Green Valley, WIN System Affi | 3672 | KH6FV-3 | Guam |
| 3268 | KD0S | Pierre | 3400 | WL7CWE | Anchorage - Wasilla | 3551 | KB6KPK | Orange | 3673 | K6TZ | Santa Barbara |
| 3269 | N5RWH | Houston-Clear Lake City | 3402 | NA6M | Georgetown | 3555 | KE7OPJ | Simplex Micro-Node,Henderson | 3676 | KB5GAS | Albuquerque |
| 3270 | K7SDC | Castle Dale | 3405 | N3ZUU | Breiningsville | 3556 | K6VGP | Mount Disappointment | 3677 | KE7NTF | Brookings |
| 3274 | W5WTN | Las Vegas | 3412 | K5SLD | Arlington | 3557 | WA6TXY | Oat Mtn | 3678 | WB6X | Palmdale |
| 3276 | K7SKW | Bellingham | 3413 | K6JSI | Coalinga - WIN System | 3558 | NZ6L | San Pedro | 3679 | K7VVI | Burien-Seattle Sea Tac airport |
| 3277 | AH6HN | Keaau | 3415 | MOGNK | Pateley Bridge | 3560 | WB6HII | Ferndale/Eureka | 3682 | KC7IIB | South Jordan |
| 3278 | KC6PXL | Los Angeles | 3417 | NB7C | Payette | 3561 | WB0ZUR | Arlington | 3685 | WD5M | Rhame |
| 3279 | K5RAV | Harlingen | 3418 | N3TOY | Las Vegas | 3564 | W7RAT | Portland | 3686 | KA6AMR | Duarte |
| 3280 | WX7Y | Castle Dale | 3420 | N7PIR | Portland | 3565 | KB7RRE | Las Vegas | 3688 | KI6LUK | Lakeport |
| 3283 | KE5HTA | Houston | 3421 | WR6ABD | San Jose - LPRC - WIN System | 3567 | WOIT | Corpus | 3692 | KB7KB | Bozeman |
| 3285 | K6LIE | Albuquerque | 3423 | AJ9Y | Tolleson SW Phx | 3568 | KF7FY | Pocatello | 3693 | AA2V | Milwaukie |
| 3286 | WA2YZT | Golden | 3437 | N5KF | Georgetown | 3569 | K4EZ | Hillsville | 3695 | N5GI | Dallas/Ft. Worth/ McKinney |
| 3287 | K6SOA | Laguna Beach | 3440 | AH6GR | Wailuku Heights, Maui | 3570 | N7HQZ | Ferndale | 3696 | WB5UGT | Bastrop |
| 3290 | N7ARR | Las Vegas NARRI | 3442 | N0CF | Waterloo | 3571 | N7MRN | Pahrump | 3698 | KB8JXX | Anchorage - WIN System Affil. |
| 3291 | W0CRA | Denver | 3446 | KL2AZ | Anchorage | 3574 | WA7GTU | Cedar City | 3699 | N1UPS | Westminster |
| 3293 | AF8D | Kingwood | 3447 | KE6DEL | Littleton | 3575 | NR7K | Saint George | 3701 | WL3WX | Bossier City |
| 3294 | WB6YMH | Palos Verdes | 3448 | N6RBR | Redondo Beach [WALA] | 3576 | WB7REL | Manti | 3703 | WB6ZVW | Morgan Hill |
| 3297 | WB6ZVW | Morgan Hill | 3450 | N0SZ | Boulder [RMHR] | 3578 | W7DES | Salt Lake City | 3704 | WX5LAW | Lawton |
| 3298 | AD5ZX | Springdale | 3453 | KB5VZY | St. Louis (Olivette) | 3580 | WU7Q | Sacramento | 3705 | N7ARR | Mesquite NARRI |
| 3299 | W5KTC | Port Lavaca | 3454 | K7CSL | Tempe | 3583 | K7EK | Lakewood/Tacoma | 3707 | K5DG | LaFeria |
| 3300 | N6DGT | Tucson | 3455 | KG6QIL | San Jose | 3584 | KD7KQG | Magna | 3710 | WA4HND | Grand Junction |
| 3301 | N7NGM | Prescott | 3456 | KG5BZ | Port Aransas | 3585 | WE6L | Upland | 3713 | WS5D | Clovis |
| 3303 | AA0BW | St. Joseph | 3457 | KB0GRP | O'Neill | 3587 | WZ6L | Vallejo | 3715 | K6JV | Rancho Mirage |
| 3307 | WR7CW | Gillette | 3458 | N6HHP | Downtown Los Angeles (WALA) | 3588 | KL3K | Anchorage | 3718 | N6USO | Claremont |
| 3309 | N0NDP | Kansas City | 3459 | KL3K | Houston MP 58 Parks Hwy. | 3589 | N6SPD | Monterey Bay [WALA] | 3721 | N0ZHF | Alliance |
| 3311 | AF7DX | Sequim | 3460 | WA6LA | Palos Verdes I [WALA] | 3590 | N0BVE | Minnetonka | 3722 | K0ELK | Carbondale |
| 3312 | KB6LMD | Lakeport | 3464 | W7TAR | Jackson | 3591 | KB0TUD | Bridgeton | 3724 | K7IZA | Micro-Node Repeater, Henderson |
| 3313 | KL3K | Palmer | 3465 | AL7YK | Bethel | 3592 | KL3K | Seward MP 7 Seward Hwy. | 3725 | KH6FV-9 | Hilo |
| 3316 | N6USO | Micro-Node Mobile, La Verne | 3467 | KE0TY | Grand Junction | 3594 | K5DJS | Micro-Node Mobile | 3726 | KR6WP | Redwood City |
| 3318 | K6BJ | Santa Cruz | 3468 | KLOAD | Kodiak | 3595 | W9NSS | Rogers | 3727 | K6JSI | Intertie |
| 3319 | K7FED | Henderson | 3469 | KS6I | Tehachapi | 3598 | K6JWN | Dixon | 3728 | KL2NM | Juneau |
| 3320 | N7GZT | Columbia | 3470 | N6ICW | Sacramento | 3599 | KC7NQU | Yacolt | 3730 | NH6HF | Lihue |
| 3321 | W03B | North Las Vegas | 3475 | KC7AAD | Spokane | 3600 | AK5Z | Harlingen | 3732 | KL1DA | Glennallen |
| 3323 | K7IZA | Las Vegas, NARRI Affiliate | 3478 | * | | 3602 | K5FRC | Bonham | 3734 | W6IY | Bishop - WIN System Affiliate |
| 3324 | N7UJK | Aberdeen | 3480 | WA6LA | Palos Verdes II [WALA] | 3603 | W6PX | Shingle Springs | 3737 | W6BUG | Portola Valley |
| 3328 | K0BVC | Mondamin | 3481 | KC7TIG | Mobile Node | 3606 | KE4QAP | Micro-Node Repeater, Sophia | 3739 | N7MRN | Pahrump |
| 3329 | N7QXO | Battle Ground | 3483 | KL3K | Anchorage | 3607 | KR7K | Clearfield | 3740 | KC2QVT | Westampton |
| 3330 | WA7UHF | Seattle | 3484 | XE1FUZ | Arandas | 3608 | NWOK | Colby | 3741 | W6IRE | Ridgecrest |
| 3331 | KK6JAB | Santa Rosa | 3486 | WB5UGT | De Ridder - Saltgrass Link | 3610 | N0DNE | Thornton | 3744 | WA7GIE | detailed info never submitted |
| 3332 | K6IB | Fremont | 3489 | N6CCR | K6SCA Red Mule Repeater Group | 3612 | K6TAV | Fountain Valley | 3745 | KE6HRV | Buena Park (Orange County) |
| 3333 | W7AVM/R | Whidbey Island | 3491 | N7ARR | Pahrump NARRI | 3615 | KC7KEY | Maple Valley | 3747 | K5MOT | Fort Worth - NWS SKYWARN |
| 3334 | AE6TV | Micro-Node "Video" Mobile | 3492 | K6JSI | Modesto - WIN System | 3616 | K0GFM | St. Louis | 3750 | W0KU | Golden |
| 3336 | KE70PJ | Henderson | 3497 | AF6EQ | Sunnyvale-WIN System Affiliate | 3617 | KI6RDW | Hermon | 3751 | K5RNB | Aubrey |
| 3337 | N5ZUA | Cat Spring | 3500 | K6JSI | San Diego - WIN System | 3618 | K6PTB | Los Angeles | 3753 | N5ZUA | Bayou Vista |
| 3339 | W6DVI | San Gabriel | 3501 | WA6HSL | Spokane | 3619 | KF6EIA | Lakeport | 3754 | W7RUG | Idaho Falls |
| 3340 | WR6JPL | Pasadena | 3503 | KG7SD | Spokane | 3620 | KU6V | SF Bay Area | 3755 | WA7RVV | Medical Lake |
| 3341 | N7OD | Hemet - San Jacinto Valley | 3505 | KF6HPG | Poway | 3622 | KE5JTS | Woodbridge, CA | 3756 | AH6JA | Hilo |
| 3342 | KF5YO | Lakeview | 3506 | KL3K | Anchorage | 3624 | KB7RRE | North Las Vegas | 3759 | KD0EAV | Kansas City |
| 3343 | AE6ZM | Lincoln | 3507 | N7FM | Spokane | 3625 | K6RCL | Goleta | 3761 | W5PAA | Oklahoma City |
| 3344 | N6DSP | Stanton [WALA] | 3509 | W7KX | Carnation | 3628 | KE7JFA | Idaho Falls - EchoIRLP #319230 | 3765 | WA6ZFT | San Diego |
| 3345 | W0CBI | Centennial | 3510 | W7VOA | Seoul HL1/W7VOA | 3629 | WB9STH | Las Vegas | 3767 | AF6SP | Hacienda Heights |
| 3347 | WORXX | Irvine | 3511 | K6MFM | Maumelle | 3630 | N7ACM | Reno - Calnet | 3769 | KS0GLD | Goodland |
| 3348 | K0KN | Olathe [EchoIRLP] | 3513 | W0JAY | Seymour | | | | | | |

| Node ID | CallSign | Location |
|---------|----------|--------------------------------|
| 3770 | K1BDX | Houston - Clear Lake City |
| 3771 | AC7OD | Monroe |
| 3772 | K1BDX | Austin - Bee Cave |
| 3774 | KCOHH | Lamar |
| 3778 | K1BDX | Huntsville Tx |
| 3781 | K6SOA | San Clemente |
| 3785 | W6AMG | Thousand Oaks |
| 3786 | WX5FWD | Fort Worth - NWS SKYWARN |
| 3787 | KL3K | Fairbanks |
| 3788 | K6JRM | Hemet |
| 3794 | KCOVDJ | Limon |
| 3795 | WD5IEH | San Antonio |
| 3796 | N6SPD | N6SPD Mobile IRLP node |
| 3797 | N7EN | Gilbert |
| 3798 | K16UWB | Ripon |
| 3800 | AH6JA | Hilo |
| 3801 | WB6MYP | Sherman Oaks |
| 3802 | KJ6VU | San Jose |
| 3803 | WA6UHF | Chico |
| 3804 | N7HMS | North Bend |
| 3805 | W7YC | Carrollton |
| 3806 | W7LKO | Elko |
| 3807 | N5KWL | Little Rock |
| 3812 | W6REB | Redding |
| 3813 | W9JMC | Soldotna (EchoIRLP)357941 |
| 3820 | KC7GHT | Phoenix - EchoIRLP |
| 3821 | W6PBX | Quincy |
| 3824 | KD7SKX | Elizabeth City |
| 3826 | N7GV | Green Valley |
| 3827 | WB6IAG | Mini-Node Mobile |
| 3828 | WA6AXO | Juneau |
| 3829 | WB5UGT | Lufkin - Saltgrass Link |
| 3830 | WB5EUK | Los Angeles |
| 3831 | KE7FGB | Green River |
| 3832 | N5VAV | Richland Hills/ Ft. Worth |
| 3834 | NOWFI | Minneapolis - Ham Lake |
| 3835 | WR0U | Mt. Pleasant / Westwood |
| 3836 | W7YC | Slidell |
| 3837 | N7GTE | Jackson Park |
| 3840 | K6IXA | Atwater |
| 3843 | AD5OU | Houston |
| 3844 | KA6RLP | Santa Monica |
| 3847 | K6JSI | Fresno - WIN System |
| 3848 | WA6DKS | Granada Hills |
| 3849 | KOAMJ | Excelsior Springs |
| 3850 | W7DFD | Tucson |
| 3851 | WA6E | Loomis |
| 3854 | KCOCVU | Colorado Springs |
| 3856 | KD6RC | Santa Rosa |
| 3858 | KH6FV 8 | Honolulu - Portable Node |
| 3860 | WA7SPY | Folsom |
| 3862 | WA2JM | Monmouth |
| 3864 | KCOEFC | Lenexa |
| 3865 | KE6LGE | San Antonio |
| 3866 | KD5YCY | Abilene/Shep |
| 3867 | W5DEL | Oklahoma City |
| 3868 | KCOBJZ | Mina |
| 3869 | WD5KCX | Houston |
| 3876 | NJ7J | Clearfield |
| 3877 | W16RE | Ridgecrest/China Lake - WIN Sy |
| 3880 | K6RTL | Orangevale |
| 3881 | KJ7IY | North West Washington County |
| 3882 | K6TEA | South San Francisco |
| 3884 | N6EW | Los Angeles (B.A.R.C. 4) |
| 3886 | N5ZUA | Portable Micro-Node Repeater |
| 3887 | AC0KC | Fort Lupton |
| 3890 | N4OKL | Huntsville |
| 3892 | WD7F | Tucson |
| 3894 | KD6WAB | Salem |
| 3895 | W6MAR | Sacramento, Echo 303846 |
| 3896 | W7QED | Tucson |
| 3897 | WB6IWW | Cornelius |
| 3901 | KG6FOS | Bakersfield |
| 3902 | K1TJ | Fort Collins |
| 3903 | WB5EUK | North Hills |
| 3904 | N7DEN | Cheyenne |
| 3907 | KA6GEM | Piedmont |

| Node ID | CallSign | Location |
|---------|----------|---------------------------------|
| 3908 | K9VKG | Sioux Falls |
| 3909 | WW7SEA | Seattle - Columbia Center |
| 3910 | WB6DAO | San Gabriel Valley, East of LA |
| 3911 | KF6QYX | Las Vegas - Win System |
| 3912 | K6JRM | Hemet - Win System Affiliate |
| 3913 | N7JYS | Hays |
| 3914 | W5MCC | New Orleans |
| 3915 | KORPT | Lincoln |
| 3916 | WA7BND | Portland |
| 3917 | N7JYS | Russell |
| 3918 | KF6CHA | Mojave |
| 3920 | K6MF | Santa Barbara |
| 3923 | KG6PH | Plano |
| 3924 | N7HOR | Tucson |
| 3926 | KG6ATN | Foster City |
| 3927 | WD6FTB | Santa Rosa |
| 3928 | KE7JBK | Safford |
| 3930 | K6MF | San Jose |
| 3932 | WA6ZFT | Bishop |
| 3936 | W0FLO | Chadron |
| 3938 | N6EOC | San Carlos NOC |
| 3939 | K9GAJ | Santa Fe |
| 3941 | WB6AIA | Hemet - EchoLink#39419 |
| 3942 | WD0BQM | Mitchell |
| 3944 | K5JFW | Lakewood |
| 3946 | W6SMV | Templeton, CA |
| 3951 | K5COD | Victoria |
| 3953 | NX5V | Springdale |
| 3956 | K5NES | Deshia |
| 3957 | N1NG | Spokane |
| 3962 | WB5UGT | Plum Grove - Saltgrass Link |
| 3967 | N6SGX | Ontario |
| 3969 | K7KAB | Loving/Graham |
| 3971 | W2IO | Renton |
| 3972 | WB0QMR | Breckenridge |
| 3973 | KC2EE | Spring |
| 3974 | N0JPX | La Veta |
| 3976 | W7BO | Woodland |
| 3978 | K7LWH | Seattle/Kirkland/ Bellevue/Redm |
| 3979 | N05DE | Albuquerque |
| 3981 | W7RY | Yacolt/Vancouver |
| 3984 | KA0BSA | Steamboat Springs |
| 3986 | WD5IEH | Gonzales |
| 3987 | W6COH | Hemet - EchoLink#39871 |
| 3988 | KB5ZPZ | San Antonio |
| 3989 | K5DX | Houston |
| 3990 | W0CRA | Denver |
| 3992 | KE7FZX | Bellevue |
| 3993 | K7IEU | Raymond |
| 3994 | N6QOP | Northern California & Nevada |
| 3995 | KC0LUN | Springfield |
| 3996 | KL3K | Victory MP 90 Glenn Hwy |
| 3997 | N5WD | Lake Worth |
| 4000 | WA3KOK | Washington |
| 4001 | WX1PBD | Peabody |
| 4007 | W4XKE | Crossville |
| 4011 | KP4EOP | WIFI-Portable |
| 4012 | KC2PKN | Boston [ILS] |
| 4013 | N8DP | Gladstone |
| 4014 | KB3SNM | Spring Grove [S. Central PA] |
| 4016 | KE2EJ | Plainview |
| 4017 | KB3SNM | Spring Grove [ILS] |
| 4019 | WX4RUS | Phenix City |
| 4021 | K4VMS | Port Charlotte / Englewood |
| 4022 | K4PAL | Miami / Fort Lauderdale |
| 4024 | AB1EX | Blackstone |
| 4025 | KA2AJH | Wellsville |
| 4031 | K9IU | Bloomington, IU ARC |
| 4033 | WB2MOD | Wellsville |
| 4035 | KD8AYM | Owosso |
| 4036 | K16DXN | Fullerton |
| 4038 | N3XXH | Laporte |
| 4039 | N3WPL | Warren [ILS] |
| 4040 | N3CDY | Baltimore |
| 4042 | KB9E | Carbondale |
| 4049 | W9LKI | Angola |

| Node ID | CallSign | Location |
|---------|----------|------------------------------|
| 4050 | N2BJ | New Lenox |
| 4053 | W2RAC | Daytona Beach |
| 4055 | KG4YJB | Petersburg-Ettrick |
| 4060 | W1IMD | Falmouth |
| 4065 | WB4GQX | Cumming |
| 4067 | WB2JPQ | Orange City [ILS] |
| 4068 | WB2JPQ | Buffalo [ILS] |
| 4069 | W4SNA | Winston-Salem |
| 4071 | WJ8E | Toledo |
| 4072 | WB3IGM | Kane |
| 4075 | KP4E | Grosse Pointe Farms |
| 4076 | KB4PTJ | Williamsburg |
| 4077 | N4IRS | Vero Beach |
| 4083 | K3OCM | Dowell |
| 4084 | WL7BHJ | Murfreesboro/Smyrna |
| 4085 | KP4TR | Tampa Bay |
| 4086 | AE1TH | Braintree |
| 4087 | W8SAI | Mason |
| 4088 | WA3KOK | Ashton |
| 4089 | N2XFX | Orchard Park |
| 4090 | KB2FAF | Cortland |
| 4091 | KD8LXJ | New Matamoras |
| 4096 | KB1AEV | Bristol |
| 4097 | K2GII | Winter Haven [ILS] |
| 4098 | KA9OHV | Warsaw |
| 4100 | N3FE | Portable |
| 4103 | WB2WJF | Lantana [ILS] |
| 4106 | W8VFR | Eaton |
| 4107 | WA2ZPX | Patterson |
| 4110 | K0PCG | Des Moines |
| 4111 | KD4IHB | West Palm -Echolink #41119 |
| 4115 | W5NRU | under construction (aa5sg) |
| 4117 | KC2LRC | Syracuse |
| 4119 | KA9KDC | Wheaton |
| 4120 | KF6SWL | Omaha - WIN System Affiliate |
| 4124 | N4YCW | Niceville - EchoIRLP #290450 |
| 4126 | KC8LRN | Hillsboro |
| 4128 | WC4PEM | Bartow |
| 4130 | WA2ZPX | Middletown |
| 4133 | W1MRA | Marlborough |
| 4134 | KP4EOP | Chicago |
| 4135 | WP3OY | Chicago - EchoIRLP 6334 |
| 4137 | K8KHV | McConnellsville |
| 4138 | ND1U | Notre Dame |
| 4139 | N2STU | West Sayville |
| 4142 | W8FSM | Fenton |
| 4147 | KB5ELV | Erie |
| 4148 | WA2RYY | Bayshore |
| 4150 | N5IUF | Dallas/Ft.Worth |
| 4153 | AA8K | Port Huron |
| 4155 | WOAC | North Port-ECHOLINK # 41555 |
| 4156 | WC4PEM | Bartow |
| 4159 | W1HDN | Vernon |
| 4163 | KD8BMI | Morgantown |
| 4167 | N8JPR | Grand Rapids |
| 4168 | K8SN | Grand Rapids |
| 4169 | KA6UHV | Collegedale |
| 4170 | WB7SMM | Caldwell |
| 4171 | KN2R | Cape Coral |
| 4172 | W4NCR | Wilmington-EcholIRLP-96977 |
| 4173 | WA3KOK | Laurel |
| 4175 | N5CWH | Leesville |
| 4176 | WD9GWG | Osceola |
| 4177 | WX2NYC | Middle Village, Queens |
| 4179 | W4UNC | Chapel Hill |
| 4183 | KA4VXR | Hampton |
| 4184 | KK2QQ | Brooklyn-Park Slope |
| 4186 | K8EHB | Delaware-Columbus |
| 4187 | WB9TLH | Kirksville |
| 4188 | K3MMB | Frederick |
| 4189 | WB2SNN | Portable |
| 4200 | AA4LB | Simpsonville |
| 4204 | N2VYS | New York City |
| 4207 | N2LEN | East Windham NY |
| 4208 | KS4BO | Roanoke |
| 4209 | AC4DM | Nancy |
| 4213 | KC9IXL | Argos |

| Node ID | CallSign | Location |
|---------|-----------|-------------------------------|
| 4221 | N9OB | River Falls |
| 4222 | KB2SOZ | Macedon |
| 4223 | NC2EC | MINEOLA |
| 4232 | K4DCA | Reagan National Airport (DCA) |
| 4234 | N3KZS | Hanover |
| 4235 | WB8VSU | Dayton |
| 4239 | N9IFG | IngleSide |
| 4242 | KB2NYH | Rosedale |
| 4243 | W0NWA | Pinnacle Peak |
| 4244 | WB9WYR | Niles |
| 4245 | NB1MA | New Bedford |
| 4246 | N2TDI | Flagler County |
| 4250 | WR2ROC | Rochester |
| 4251 | AH6EZ | St. Charles |
| 4252 | WR2ROC | Rochester |
| 4253 | N9UMJ | Buddah |
| 4254 | W2FCC | West Arlington |
| 4260 | KD4RAA | Raleigh |
| 4265 | W2YMM | Bethpage - Long Island |
| 4267 | W8FM | Dayton |
| 4270 | KD4RAA-2 | Raleigh |
| 4273 | K5MES | Fort Smith |
| 4280 | W9ADS | Champaign-Urbana |
| 4282 | WR8ABC | Cleveland |
| 4287 | WB2SNN | South River |
| 4288 | KA0JQO | Mountville |
| 4289 | AE9J | Danville |
| 4291 | N3HF | Ocean City |
| 4292 | W1AW | Newington |
| 4294 | W9GAP | Ogdensburg |
| 4299 | WB8APD | Willoughby |
| 4304 | WA4MAS | Richmond |
| 4306 | AF2A | ITHACA |
| 4307 | KG9F | Lisle |
| 4308 | G0TTQ/ W4 | Foley EchoIRLP node |
| 4309 | W2AMC | Peconic |
| 4311 | AJ5C | Harrison |
| 4312 | N8GCI | Morrow |
| 4314 | KB1GXW | Boston |
| 4315 | W9YB | West Lafayette |
| 4316 | KB9KLD | Maryville |
| 4317 | K3ZMC | Pottstown |
| 4318 | N4DFQ | Somerset |
| 4320 | W1QWT | Scituate |
| 4321 | WB4FOW | Fort Myers |
| 4322 | W1TOM | Springfield |
| 4324 | W6SMV | Mobile Micro-Node |
| 4326 | KE7EZJ | KENT |
| 4328 | KE5QJQ | Baton Rouge |
| 4329 | KC2JES | Lyndhurst |
| 4330 | K9WZ | Plymouth |
| 4331 | K4QJZ | Front Royal |
| 4335 | NS1N | Hingham |
| 4338 | N4ARG | Kissimmee |
| 4342 | K4RPT | Melbourne |
| 4344 | N1HUI | Branford |
| 4346 | AB2OQ | Blasdel |
| 4347 | W1AEC | Dartmouth |
| 4350 | W9DXN | Dixon |
| 4353 | K16SZ | Beavercreek |
| 4354 | KF3EM | Hummelstown |
| 4355 | W1FY | Framingham |
| 4357 | N8UEV | Morgantown |
| 4358 | K4TJS | Yorktown |
| 4359 | W8FSM | Holly |
| 4364 | KA4BNI | Dresden Echo/IRLP Node |
| 4372 | KB1FX | Woburn |
| 4373 | K8DAA | Holland |
| 4377 | W2DEM | Springfield |
| 4380 | W9BCC | Wausau |
| 4387 | N8P6N | Bridgetown |
| 4388 | W1MV | Bridgewater |
| 4391 | N8KQQ | Muskegon |
| 4393 | W1JLI | Norwood |
| 4395 | KB1AEV | Vernon |
| 4396 | N2JBM | East Northport |
| 4397 | K4RCC | Sylva/Waynesville |
| 4410 | N9OIG | Union Grove |
| 4411 | N2NFI | Manorville |
| 4415 | W4PLT | Port Saint John |

| Node ID | CallSign | Location |
|---------|----------|-------------------------------|
| 4417 | W8DOW | Livonia |
| 4424 | W4RAT | Richmond |
| 4427 | NS1RA | Danvers |
| 4428 | W2PUT | Milan [ILS] |
| 4433 | KA4EPS | North Boynton Beach |
| 4434 | KB2WVY | Venice |
| 4436 | W1AFD | Acushnet |
| 4438 | W2VL | Glen Oaks |
| 4439 | KB2VZS | Fairport |
| 4442 | NN4NC | Clarkton |
| 4446 | KY2D | Morristown |
| 4448 | KB3HIY | detailed info never submitted |
| 4449 | KB2AYS | Blue Anchor |
| 4450 | N8DNX | Stutsmanville |
| 4451 | N9GMT | New Berlin |
| 4456 | n2amb | Brooklyn |
| 4458 | N4AI | Somerset |
| 4459 | KB4PQA | Greenville |
| 4460 | WB8NXP | Southfield |
| 4464 | W2CEB | Hudson (Spring Hill) [ILS] |
| 4467 | N3JUO | New Bloomfield |
| 4469 | WA2JSB | West Orange |
| 4473 | KA1IFQ | Oxford |
| 4475 | K9EAM | Green Bay |
| 4478 | W2KPQ | Selden |
| 4479 | K8LI | Delta |
| 4480 | K1IMD | Eastern Long Island |
| 4483 | W9RCG | Pewaukee |
| 4486 | N1UEC | Wrentham |
| 4489 | KB4ELJ | Miami-Echolink #44891 |
| 4490 | WB2CIK | West Hills |
| 4491 | WA2WWK | Amherst [ILS] |
| 4494 | KC6HUR | Sun Valley |
| 4500 | N3FE | Wellsboro |
| 4501 | W9PQ | Melbourne |
| 4502 | W8HP | Beverly Hills |
| 4503 | KB4PTJ | Williamsburg |
| 4505 | W1GHW | Fairfield |
| 4507 | KB3PBX | Girard |
| 4513 | KC2CWT | Carmel |
| 4514 | KD5AR | Oakland - Bull Shoals Lake |
| 4515 | N9GMR | Port Orange |
| 4522 | WA7RZW | Gray |
| 4523 | W8AK | Dayton |
| 4527 | WA2EPI | Lake Hopatcong |
| 4529 | K8RPT | Maybee |
| 4532 | * | |
| 4533 | N8VZ | Athens |
| 4542 | WA3KOK | Clarksville |
| 4544 | AB2OR | Lackawanna |
| 4545 | W4AKH | Fort Pierce |
| 4546 | WB3EHB | Camden |
| 4547 | KC8RBZ | Cincinnati East Side |
| 4548 | KG4GOQ | Palm Beach County |
| 4549 | KB0IXM | Fargo |
| 4550 | W4DOC | Atlanta |
| 4551 | WA2ZLB | Manhattan |
| 4557 | N4SJW | Charleston |
| 4561 | K1CA | Derry |
| 4563 | WB2JPQ | Deland [ILS] |
| 4571 | N1ZZN | Marshfield |
| 4576 | AF2M | Orlando [ILS] |
| 4577 | N3GX | Chesapeake |
| 4579 | K1RFD | Norwalk |
| 4590 | N1HUI | Branford |
| 4591 | K2ILH | Amherst / Buffalo |
| 4592 | N2QDK | Albany |
| 4593 | K1RFD | Danbury |
| 4597 | N8XHZ | Tiffin |
| 4604 | WW2ARC | Ocean Township |
| 4606 | N9GMT | Milwaukee |
| 4609 | KC9HZT | Greenville |
| 4610 | WA1NVC | Framingham |
| 4611 | KD5KNZ | Baton Rouge |
| 4614 | K0KC | Powell (Columbus) |
| 4615 | W2GLD | Cherry Hill |
| 4617 | W1SMA | Fairhaven |
| 4618 | KB9QJN | Merrill |
| 4619 | N9DKH | Green Bay |
| 4624 | N3HFK | Hopkinton |

| Node ID | CallSign | Location |
|---------|----------|--------------------------------|
| 4630 | N9EP | Barrington |
| 4632 | K1BFD | Canton |
| 4635 | W8LRC | Lowell |
| 4637 | N4TCP | Clayton |
| 4640 | N5LEZ | Wichita Falls |
| 4641 | KB4CRG | Huntsville |
| 4642 | K8BRC | Bangor |
| 4643 | N8EOD | Walker |
| 4647 | N4BSA | Clearwater |
| 4649 | KB9E | Gurnee |
| 4650 | KA1UAG | W.Lebanon |
| 4654 | K0NOD | Clearfield |
| 4660 | K14L | Nashville |
| 4661 | KB2EAR | Kendall Park |
| 4663 | W1WPD | Woodbridge |
| 4664 | K1PL | Cromwell |
| 4665 | KB2RF | Freehold |
| 4666 | K2MTB | New Paltz |
| 4667 | NR4P | Boynton Beach |
| 4669 | N8TWM | Mansfield / Echolink *46692 |
| 4670 | N9UWE | Danville |
| 4671 | N6WI | Berryville - WIN System Affili |
| 4672 | K4KWQ | Deland [ILS] |
| 4676 | W2MSK | Bergenfield |
| 4677 | N2NFI | Eastern Long Island |
| 4678 | W4WSM | Bowling Green |
| 4679 | N9GN | Arlington Heights |
| 4683 | KC2LPU | Byram |
| 4686 | W4FOT | Hendersonville |
| 4689 | W1IMD | Portland |
| 4700 | WR2UHF | Happauge [ILS] |
| 4703 | K4DND | Charlottesville |
| 4705 | K4TTC | Hohenwald |
| 4710 | WB8CXO | Akron |
| 4712 | N3HF | Silver Spring |
| 4715 | WB2JPQ | Eden [ILS] |
| 4718 | NG8Y | Pleasant Plain |
| 4719 | W4UAL | Tuscaloosa |
| 4721 | W4CIA | McLean |
| 4722 | NU3A | Newark |
| 4726 | N2LQP | Garden City |
| 4727 | N90EQ | Appleton |
| 4730 | K9IP | Indianapolis |
| 4732 | K9IP | Grandview |
| 4733 | W9EI | Could be Anywhere |
| 4734 | K9DC | Portable |
| 4737 | AB8E | Elkins |
| 4739 | WB4BSD | Cleveland |
| 4740 | N2MH | West Orange |
| 4748 | * | |
| 4751 | N1UEC | Wrentham |
| 4753 | K14VP | Powell (Columbus) |
| 4759 | KB1FUV | Salem |
| 4762 | WA2QDP | Wellesley Island |
| 4766 | K4WWV | Alamo/Jackson - Testing Phase |
| 4767 | KE4PJW | Nashville |
| 4769 | KE4SCS | Petersburg |
| 4772 | KC0ARF | Green Bay |
| 4774 | W9YRC | Elmhurst |
| 4775 | K4UCF | Orlando |
| 4777 | W2QW | Green Brook |
| 4779 | K9EQ | Ham Lake |
| 4783 | AB2UV | Port Jervis - Orange County |
| 4787 | K14VFB | Ft. Lauderdale-Echolink #47873 |
| 4788 | KA9VZD | Antioch |
| 4789 | K2GE | Sayreville |
| 4790 | K3TAT | Media |
| 4793 | W3FL | Orange City [ILS] |
| 4799 | W2WHS | Webster |
| 4802 | KC9EVU | Bloomington |
| 4810 | KF6FM | Riverside |
| 4811 | VE3VBT | London |
| 4812 | KC8QVX | Jonesville |
| 4818 | KB8ZGL | Greenville |
| 4819 | N2NEI | East Hampton |
| 4823 | K2KNB | Old Bethpage |
| 4824 | N1RCW | Forestdale [ILS] |
| 4827 | WA2GUG | New Hyde Park |

| Node ID | CallSign | Location |
|---------|----------|--------------------------------|
| 4829 | K1LNX | Johnson City |
| 4830 | N4IRS | St. Lucie County |
| 4834 | KB9VE | Anderson |
| 4835 | K8TB | Hudsonville |
| 4842 | KB9FMU | DeKalb |
| 4844 | N2LYJ | Buffalo |
| 4847 | KB3HJC | Carlisle |
| 4850 | W9CEQ | Aurora |
| 4851 | KC4SCO | Research Triangle Park |
| 4852 | K4MJ0 | South Hill 3 Repeaters |
| 4853 | K4HV | Valkaria |
| 4864 | KF4LZA | Ft. Lauderdale-Echolink #48646 |
| 4866 | NC4FM | Rocky Mount |
| 4867 | W3SC | Pottsville |
| 4868 | WK8H | Vermontville |
| 4869 | KM3T | Amherst |
| 4870 | W1HHO | Mid Coast |
| 4873 | KC8NDZ | Charleston |
| 4878 | K2GLP | Sag Harbor |
| 4879 | K3OCM | Dowell |
| 4880 | N4TCP | Tampa |
| 4881 | WA1HC0 | Mont Vernon |
| 4882 | WBOCPR | Philadelphia |
| 4883 | K2ACY | Brigantine Island |
| 4886 | KT2K | Sea Girt |
| 4887 | KA4EPS | Margate / North Broward County |
| 4889 | KC2IV1 | East Greenbush |
| 4898 | KP4WK | Tampa Bay |
| 4900 | AF4TZ | Nashville |
| 4903 | K4GRW | Newport |
| 4904 | WD4HIM | Orlando [ILS] |
| 4908 | W2SO | Lancaster (Near Buffalo & Niag |
| 4910 | WA3ADI | Havertown |
| 4915 | K2RMX | Brooklyn-Sunset Park |
| 4918 | K4PSL | Port Saint Lucie |
| 4921 | KG6CXP | Alva - WIN System Affiliate |
| 4922 | N2FCC | Union |
| 4923 | KB2ERJ | Camillus |
| 4924 | N80BU | Dansville |
| 4926 | KC8UFV | Toledo |
| 4927 | W9BIF | Goshen |
| 4928 | AA5SG | Heidelberg |
| 4935 | W2NJR | Asbury Park |
| 4939 | K9WSS | Westmont |
| 4942 | W1CLA | Brookline |
| 4943 | KB4ZIN | Williamsburg |
| 4945 | KY4K | Henderson |
| 4948 | N3CB | Plymouth Meeting |
| 4949 | K4ZPZ | Orlando |
| 4951 | N2PDO | Long Island,NY |
| 4952 | KP4DX | Corona |
| 4953 | KC9MFX | South Holland |
| 4954 | K14HZP | Palm Bay |
| 4960 | N9GPY | Culver |
| 4961 | N9GPY | Culver |
| 4963 | KY4MT | Hazard |
| 4967 | KB3HJC | Mt Holly Springs |
| 4974 | K3BAY | Pasadena |
| 4975 | WA4RYW | Knoxville |
| 4977 | K1RJZ | Boston |
| 4978 | W1MRA | Marlborough |
| 4979 | K9GXU | Belleville |
| 4987 | W70TQ | Virginia Beach |
| 4988 | KA4EPS | Deerfield Beach |
| 4992 | KE7ULC | Vail WIN System Affiliate |
| 4993 | W1AD | Rutland |
| 4994 | W9UUM | La Crosse |
| 4995 | W4RAT | Richmond |
| 4996 | K8SN | Jenison |
| 4999 | K4FAU | Boca Raton |
| 5034 | DM0ZF | Lauf/Black Forest |
| 5046 | GB3EE | Chesterfield |
| 5050 | KD6LVP | Portland |
| 5056 | EB8CTT | Las Palmas |
| 5060 | K6LRC | Lake Almanor - Susanville |
| 5070 | W4DOC | Atlanta |
| 5097 | MB7IMR | Marske by Sea |
| 5100 | G4CUI | Sheffield |
| 5108 | GB3TU | Tring, Hertfordshire |

| Node ID | CallSign | Location |
|---------|----------|-------------------------------|
| 5113 | GB3WJ | Scunthorpe |
| 5130 | GB3DV | Maltby |
| 5140 | GB3LF | Kendal |
| 5147 | GB3YR | Maltby |
| 5159 | EI2TAG | Limerick |
| 5161 | G1DVA | Lymm |
| 5170 | G6YHW | Middleton, Leeds |
| 5196 | GM1PLY | Edinburgh |
| 5199 | EA2BKH | Zaragoza |
| 5200 | G4NJI | Rotherham |
| 5234 | EI7DUR | Dublin |
| 5264 | 2E0PMT | Micro Node, Houghton Green |
| 5265 | MB7IAS | Framlingham |
| 5267 | DM0IBM | Hannover/Laaten |
| 5269 | G60TZ | Burntwood |
| 5280 | GB3CA | Carlisle |
| 5289 | G4WLI | Middleton, Manchester |
| 5294 | MB7IUR | Leicester |
| 5299 | DC5MN | Herxheim 2 |
| 5302 | GB30A | Southport |
| 5307 | DB0BH | Buehl/Black Forest |
| 5310 | MM0DEC | Livingston |
| 5330 | WA1ZMS | Lynchburg |
| 5339 | GB3CS | Glasgow, Kilsyth |
| 5340 | WA3KOK | detailed info never submitted |
| 5361 | GB3FH | Cheddar |
| 5364 | GB3NH | Northampton |
| 5365 | DM0MHD | Pfaffenhofen |
| 5367 | LA8HRR | Nesna |
| 5370 | W9DUP | Downers Grove |
| 5378 | DM0QN | Munich (east) |
| 5380 | W5EVH | Laredo |
| 5385 | 2E1EDB | Gateshead Nr Newcastle |
| 5400 | GB3PZ | Manchester |
| 5410 | GB3KE | Bearsden, Glasgow |
| 5423 | SM7TKS | Torpa |
| 5426 | GM0LZE | Lewis Island |
| 5429 | GB3ZB | Dundry Hill, Bristol. |
| 5430 | WW7CPU | West Chandler |
| 5432 | M5ABT | Stanley, Durham |
| 5444 | SK0BU | Stockholm |
| 5447 | M1SJX | Kingston Upon Hull |
| 5450 | GB3PZ | Manchester |
| 5466 | LA8VRR | Mosjoen |
| 5467 | LA9KY | Rodoy |
| 5468 | LA9KY | Mosjoen |
| 5474 | LA8DR | Sandnes |
| 5477 | I21DBR | Pollone |
| 5488 | GM8HBY | Airdrie |
| 5503 | MB7IIP | Ipswich |
| 5505 | MB7IXL | Skipton, North Yorkshire |
| 5510 | MB7ICS | Dunblane |
| 5514 | G0VXN | Freckleton |
| 5515 | DB0VOX | Nuernberg |
| 5517 | SM6YRB | Kollands Isl |
| 5518 | GB3DM | Dumbarton |
| 5520 | KC4SFA | Key Largo [ILS] |
| 5530 | KE6YRU | Indianapolis |
| 5533 | G6VVM | Harrogate |
| 5550 | KD7PSG | Bellingham |
| 5555 | MB7IXN | Freckleton |
| 5560 | N7TGB | Reno |
| 5562 | GB3IR | Richmond |
| 5570 | W6FM | San Luis Obispo |
| 5582 | GB3TR | Torbay |
| 5588 | LA1PHA | Mo i Rana |
| 5590 | N9LKH | Milwaukee |
| 5600 | GB3LV | London |
| 5610 | K6VGG | Los Angeles |
| 5612 | GB3DQ | Polperro, South East Cornwall |
| 5620 | WA7GIE | Salt Lake City |
| 5682 | EI2TBR | Galway |
| 5685 | LA1W | Bodo |
| 5690 | WE8N | Warren County |
| 5702 | * | |
| 5708 | GB3XN | Langold |
| 5709 | DG3IC | Rohrbach |
| 5717 | G3SNA | Greenfield 12m NE Manchester |
| 5720 | NG5T | Lafayette - Saltgrass Link |

| Node ID | CallSign | Location |
|---------|----------|--------------------------------|
| 5723 | VK4II0 | Brisbane |
| 5750 | W6KAP | Volcano-Sacramento-Stockton |
| 5752 | GB3FF | Edinburgh |
| 5756 | EA5RCI | Elda |
| 5767 | EI7MRE | Castlebar |
| 5770 | KC4VDZ | Richmond |
| 5790 | N8GCI | Could be any where |
| 5799 | SK4SQ/R | Leksand / Mora |
| 5800 | K2GXT | Rochester |
| 5806 | GB3TO | Northampton |
| 5822 | DB0RDT | Ingolstadt |
| 5826 | G4FLY | Reading |
| 5830 | PJ7R | Sint Maarten D.W.I |
| 5841 | W5DCH | Corpus Christi |
| 5850 | KJ6W | Palmdale |
| 5852 | 2E0TWS | Sheffield |
| 5860 | K7SPG | Seattle |
| 5870 | KC0EFC | Lenexa |
| 5877 | GB3MH | Crawley |
| 5883 | EI7MLR | Waterford City |
| 5888 | GB3SL | Glasgow, Kilsyth |
| 5907 | IK2XYP | Gambolo |
| 5910 | N3CJG | Ocean City |
| 5918 | MB7IWR | Dewsbury |
| 5930 | WB2RRA | Nyack |
| 5939 | GM3ZXG | Greenock |
| 5953 | G7HIF | Wellingborough |
| 5960 | N1BOW | Niantic |
| 5961 | IK6IHL | Sulmona |
| 5971 | IT9DLN | Menfi |
| 5993 | G3TMD | Scotter |
| 6000 | VK2YX | Alice Springs |
| 6008 | VK3EGC | Loch Sport |
| 6009 | VK5IRL | Murray Bridge |
| 6014 | VK4JY | Redbank Plains |
| 6018 | VK2RMP | Maddens Pl Wollongong |
| 6036 | VK3ADE | Mount Helen (Ballarat) |
| 6037 | VK4REP | Central Highlands & Districts |
| 6040 | VK2RTZ | Newcastle |
| 6050 | VK2RCZ | Blacktown |
| 6060 | VK2RAG | Gosford |
| 6063 | VK3RBO | Bendigo |
| 6079 | VK3RFY | Hillside, Melbourne |
| 6081 | ZL2KS | Blenheim |
| 6095 | ZL1AM | Whangarei |
| 6097 | VK3XOK | Batesford |
| 6100 | VK6RNC | Perth |
| 6105 | ZL2AA | Gisborne |
| 6110 | VK1RBM | Canberra |
| 6113 | VK3CDN | Melbourne |
| 6122 | VK7AX | Experimental AR Broadcast Node |
| 6124 | VK7RTV | NWT-ATVGr. C/Coast Gawler 6M |
| 6136 | VK3CHN | Sunbury |
| 6139 | VK4XH | Brisbane |
| 6163 | VK4JKL | Cairns via VK4RCA |
| 6184 | ZL4DM | Dunedin |
| 6200 | VK6RFM | Perth |
| 6202 | VK5LY | Riverland |
| 6210 | VK2TTA | Wahroonga, Sydney |
| 6214 | VK5ZSN | Adelaide wide area |
| 6215 | VK4RSS | Brisbane (Oceanview) |
| 6217 | VK3JD | Melbourne |
| 6220 | VK2RSC | Lismore |
| 6222 | VK2BGL | Southern Sydney |
| 6233 | VK2DOR | Scone |
| 6237 | VK3NE | Gisborne |
| 6239 | VK7DY | Hobart - Nth Suburbs |
| 6244 | VK4RBY | Mackay |
| 6246 | VK4RGT | Gladstone |
| 6247 | VK3XEM | City of Whittlesea |
| 6250 | VK2ROT | Paddington |
| 6255 | VK2POO | Terranora |
| 6260 | VK2RWG | Wagga Wagga |
| 6278 | VK5RSC | Mt Terrible, Willunga |
| 6285 | ZL2KS | Blenheim |
| 6287 | VK3RBN | Burrumbet |
| 6300 | VK3RMC | Melbourne |
| 6310 | VK3RWA | Western Victoria |

| Node ID | CallSign | Location |
|---------|----------|--------------------------------|
| 6312 | VK2RCC | Warrumbungles Linked System |
| 6320 | VK3RRU | Merbein |
| 6330 | VK3RSP | Mt. Martha |
| 6343 | VK8RTE | Darwin |
| 6350 | VK3RMH | Melbourne |
| 6366 | VK2RBM | Sydney, Blue Mountains |
| 6370 | VK3RSR | Melbourne, Australia |
| 6375 | VK3IBM | Ballan |
| 6380 | VK3RNE | Albury-Wodonga (Myrtleford) |
| 6394 | ZL1KW | Kawerau |
| 6397 | ZL4AU | INVERCARGILL |
| 6402 | VK4RLW | Browns Plains |
| 6404 | VK4RC | Redcliffe |
| 6414 | VK3YVG | Lilydale |
| 6438 | VK6RMJ | Manjimup, Western Australia |
| 6444 | VK4RAT | Townsville |
| 6450 | VK4RMK | Mackay (Mt Blackwood) |
| 6459 | VK8LDR | Alice Springs |
| 6464 | VK4RCM | Gympie |
| 6493 | VK4TIM | Eastern Brisbane |
| 6496 | VK4ZPP | Gootchie |
| 6500 | VK5RAH | Lobethal (Nitschke Hill) |
| 6501 | ZL2QS | Hastings |
| 6506 | VK3RVZ | Melbourne |
| 6510 | VK5RAC | Port Lincoln |
| 6527 | VK2JJW | Buttuba, Lake Macquarie |
| 6529 | VK2RMR | Mt Riverview |
| 6537 | VK2PDS | Tahmoor |
| 6549 | ZL1IS | Waikato Repeater |
| 6556 | VK4YEH | Brisbane |
| 6564 | VK4RSC | Sunshine Coast |
| 6572 | VK3ATL | Geelong |
| 6600 | VK6RWR | Wickham |
| 6606 | VK5HS | Renmark |
| 6609 | ZL1KIWI | Hamilton |
| 6613 | VK2RGN | Goulburn |
| 6616 | VK7RTV | NWT-ATVGr. C/Coast, Gawler 2M |
| 6623 | VK2RED | Wollongong |
| 6642 | ZL4QS | Alexandra |
| 6669 | VK4KTX | Logan Central |
| 6683 | VK2RMM | Tenterfield Stanthorpe Warwick |
| 6700 | VK7TAZ | Mt.Barrow, North East |
| 6702 | VK4RGC | Gold Coast |
| 6705 | VK3ANT | Melbourne |
| 6707 | VK6RAA | Mt Barker, Western Australia |
| 6732 | VK8SJ | Katherine |
| 6739 | VK7RAD | Queens Domain, Hobart |
| 6782 | VK4RAI | Ipswich |
| 6793 | ZL2AS | Hastings |
| 6794 | VK3RLP | Cranbourne, Melbourne |
| 6800 | VK8MA | Katherine |
| 6845 | VK5CP | Younghusband |
| 6865 | VK5RMN | Port Pirie (The Bluff) |
| 6875 | VK5RSE | Millicent |
| 6900 | ZL3TMB | Christchurch |
| 6909 | VK5RAE | Pt. Augusta (Mt. Arden) |
| 6910 | ZL2LD | Masterton |
| 6912 | VK2HGK | Hurstville, Sydney |
| 6919 | VK4GF | Victoria Point |
| 6931 | ZL2VH | Upper Hutt |
| 6943 | ZL2KO | Feilding |
| 6950 | ZL1BQ | Auckland |
| 6964 | VK4BWI | SE Queensland |
| 6973 | VK4RAR | Rockhampton |
| 6989 | VK4ISP | Alexandra Hills |
| 6992 | VK3RGV | Shepparton |
| 6997 | VK2RWB | Mulwala (Southern NSW) |
| 7000 | J73D | Roseau |
| 7001 | KH6RS | Kaanapali Maui |
| 7007 | W0DK | Boulder |
| 7008 | KP4IP | Maricao |
| 7018 | KH6RS | Wailuku Maui |
| 7019 | KH6RS | Ulupalakua Puu Mahoe |
| 7020 | KH6RS | Mt. Haleakala, Maui |
| 7030 | K6JV | Oxnard |
| 7033 | N6ZEN | El Granada |
| 7035 | KI6YYW | Lakeport |

| Node ID | CallSign | Location |
|---------|----------|--------------------------------|
| 7040 | KP4EOP | Deer Park |
| 7045 | N7RON | Rawlins |
| 7058 | WH6CDT | Kahului |
| 7059 | KL2QV | Palmer |
| 7060 | W3ND | Harrisburg |
| 7068 | KA7G | Lakeside |
| 7069 | W6NUT | Cleveland National Forest |
| 7070 | WA00JS | Manchester |
| 7078 | N1UPS | Westminster |
| 7097 | K6JV | Rancho Mirage |
| 7098 | KF7BUE | Eugene |
| 7110 | W7DK | Tacoma |
| 7111 | WJ2W | New Albany |
| 7112 | K7DSR | Las Vegas |
| 7113 | WA7RZW | Gray |
| 7117 | * | |
| 7123 | W6JID | eatonville -win sys affiliate |
| 7140 | N4JDW-2 | Wilmington |
| 7142 | KZ0DEM | Springfield |
| 7149 | W5ERX | Canyon Lake - DBL |
| 7150 | KL3K | Pippin Lake MP81 Richardson Hy |
| 7151 | WT0F | Issaquah |
| 7167 | KF7HID | Dubois |
| 7184 | KE7IMF | Milwaukie |
| 7190 | WD6BNG | Barstow |
| 7192 | KP4IP | Severn |
| 7197 | WB8GRS | Little Elm |
| 7200 | V21ARC | St. Johns |
| 7205 | AJ7GZ | Liberty Lake |
| 7210 | W9KXQ | Greenville |
| 7211 | KD6GDB | Woodland Hills |
| 7214 | K6TEA | Pleasanton |
| 7217 | N0CSW | Joplin |
| 7220 | W1AJI | Derry |
| 7222 | K7ZH | Beaverton |
| 7223 | KF7REP | Duck Creek Village |
| 7225 | WA2WOJ | Croton-on-Hudson |
| 7227 | KI6JD | Micro-Node Mobile |
| 7230 | WB1GQR | Bolton |
| 7232 | K7NEL | Layton |
| 7235 | KI6YXW | RICHMND |
| 7237 | WA6DKS | Granada Hills |
| 7247 | K6PAC | LINCOLN |
| 7248 | XE1SAX | Puebla |
| 7249 | KD6KAC | Gerlach |
| 7250 | N2HJD | Rochester |
| 7260 | W4ECZ | Spring Hill |
| 7268 | N0FH | Estes Park |
| 7270 | KX1X | South Hadley |
| 7273 | W7UZO | Spokane [ILS] |
| 7279 | KB0YNA | GRAND JUNCTION |
| 7280 | N2CKH | Hendersonville |
| 7290 | W2RN | Wood-Ridge |
| 7309 | AH7GK | Honolulu |
| 7310 | N7QJB | Cheyenne |
| 7331 | * | |
| 7342 | KP3IV | Manati |
| 7344 | AE5RJ | El Paso |
| 7355 | XE1AO | Colima |
| 7358 | W6PBX | Quincy |
| 7372 | * | |
| 7373 | KI6FGR | Cupertino |
| 7377 | W7TWA | Seattle - WIN System Affiliate |
| 7378 | WW7SEA | Seattle - Queen Anne Hill |
| 7379 | W7NNQ | Renton |
| 7397 | * | |
| 7401 | N7SWW | Ogden |
| 7416 | W7RGW | SPOKANE VALLEY |
| 7417 | W7RGW | Spokane Valley (Mobile) |
| 7418 | * | |
| 7419 | KF6G0I | Sherman Oaks |
| 7421 | N6RJIA | San Pedro |
| 7424 | KL7GJ | Eagle River |
| 7427 | W6CBS | Maritime Mobile |
| 7430 | K7LYY | Kalispell |
| 7433 | K5ILS | Katy |
| 7438 | W0WVV | Nelson |
| 7449 | N0JPE | Fairview |
| 7456 | W6TCP | Pleasanton |

| Node ID | CallSign | Location |
|---------|----------|--------------------------------|
| 7460 | N7TWB | Phoenix |
| 7461 | KE7EFB | Mobile |
| 7478 | KC0SHM | Fargo |
| 7480 | N4JDW | Wilmington |
| 7483 | KD5YCY | Haskell |
| 7500 | 9Y4AT | Valsayn |
| 7505 | K1SOX | West Haven |
| 7510 | W7TRO | Lewiston |
| 7512 | V44KJ | St. Kitts & Nevis |
| 7520 | W4YI | Chattanooga |
| 7529 | KP4IP | Santo Domingo |
| 7530 | W9ICE | Indianapolis |
| 7531 | W9ICE | Indianapolis |
| 7540 | W6CBS | San Carlos |
| 7550 | K9JAC | Hubertus |
| 7557 | K9MWL | Milwaukee |
| 7566 | KB1HSZ | Eufaula |
| 7569 | KP4IP | Aguadilla |
| 7570 | K0NL | Phoenix |
| 7578 | WP3HY | Hatillo |
| 7609 | YV5FIH | Altos Mirandinos |
| 7610 | N7XEI | Port Angeles |
| 7620 | W7ARA-1 | Phoenix (downtown) |
| 7624 | KP4CV | Isabela |
| 7628 | K7WWA | Willits |
| 7639 | KL7MT | Willow |
| 7645 | N5BZM | Groves |
| 7650 | N6ICW | Sacramento - Lake Tahoe 147.19 |
| 7670 | W6RLW | San Jose |
| 7671 | WP3HY | Luquillo |
| 7682 | KE7ZWP | Ridgefield |
| 7689 | K5FX | Austin |
| 7700 | W9PCI | Central/Eagle Pt.-Med-Ashland |
| 7707 | KD7AGA | Casper |
| 7710 | W4JAZ | Cocoa |
| 7714 | NOJPK | LA VETA MOBILE NODE |
| 7717 | KA7NSR | Tempe |
| 7718 | KE5FGY | LOCKHART |
| 7720 | N2HLT | Branchport |
| 7724 | KF5BRU | Harrison |
| 7729 | K6TEM | Arcadia |
| 7731 | N7ARR | Winnemucca |
| 7737 | KK2NY | Patchogue [ILS] |
| 7738 | KE5YKM | KENEDY |
| 7739 | XE1CDX | Cuernavaca |
| 7748 | W0SD | Salem |
| 7758 | WL7CWZ | Kodiak |
| 7766 | K6KUS | Columbia Falls |
| 7796 | WP4IUO | Humacao |
| 7797 | KJ6JD | Sacramento |
| 7808 | K7FZO | North Bend |
| 7810 | NS9M | Terre Haute |
| 7814 | W2MGM | Bakersfield |
| 7815 | W6RCA | Greenville |
| 7817 | KC0WNG | MILLER |
| 7820 | WB2HWW | Queens/ New York City |
| 7830 | WB2NBU | Wellington |
| 7837 | N6IQY | Yuba City |
| 7844 | K7GPS | Medical Lake |
| 7849 | WP4CBC | Juana Diaz |
| 7870 | KA6UAI | Palomar Mtn |
| 7893 | WK7B | Phoenix |
| 7898 | P43ARC | Yamanota |
| 7900 | KN4KL | Virginia Beach |
| 7901 | K5FRC | BONHAM |
| 7909 | KE7IEE | Portland |
| 7911 | AE5R | Harlingen |
| 7930 | N8HEE | Charlotte |
| 7931 | KL7AA | Anchorage |
| 7950 | WB4IVB | Corbin |
| 7955 | KD7DUC | Rock Springs |
| 7960 | KL3K | Trapper Creek MP 115 Parks Hwy |
| 7962 | K6JWN | Dixon |
| 7967 | AF8D | Humble |
| 7970 | WA6TMJ | Hanover Park [WALA] |
| 7977 | * | |
| 7982 | WA6UHF | Chico |
| 7992 | PJ2BR | Willemstad |
| 7994 | KI6RWZ | San Jose |

| Node ID | CallSign | Location |
|---------|----------|--------------------------|
| 7995 | VP9NI | Smiths Parish |
| 8000 | SK6BA/R | Kinna |
| 8003 | KN4CI | Moulton |
| 8010 | SK4AO/R | Falun |
| 8011 | XE1GUU | Guadalajara |
| 8038 | JF6YQE | Karatsu City |
| 8045 | XE2MZB | San Nicolas de los Garza |
| 8050 | SK6QW | Gotene |
| 8051 | KB3CXQ | Aurora [ILS] |
| 8058 | WR2AHL | S. Bristol |
| 8059 | XE1ZAT | Toluca |
| 8066 | 7J1YAA | Shinjuku-ku |
| 8069 | JP3YHP/R | Hirakata |
| 8071 | K2YO | Garden City |
| 8088 | W1GPO | Tolland |
| 8090 | LA9XR | Heggedal |
| 8093 | JA2WSM | Seki City |
| 8094 | W8NBA | Pataskala |
| 8120 | WA6BAI | Visalia |
| 8125 | XE1FXT | Atotonilco el Alto |
| 8126 | XE1LM | Ciudad de Mexico |
| 8127 | * | |
| 8129 | K8KHW | Marietta |
| 8134 | WV4GW | Cumberland |
| 8136 | N0EXE | Galesville |
| 8139 | KC8QVX | Jonesville |
| 8144 | ZS1JEN | Cape Town |
| 8150 | N6AWQ | Southern California |
| 8155 | W3ALR | Abbotstown [ILS] |
| 8164 | JQ1YWK | Hachioji, Tokyo |
| 8165 | N6KZB | Wildomar |
| 8170 | W6RHC | Chico |
| 8190 | N9TO | Westmont |
| 8193 | K0DMF | North Branch |
| 8196 | AB9IF | Alborn |
| 8203 | AG9D | Montgomery |
| 8223 | XE3REM | Merida |
| 8225 | JF1CER | Shinagawa-ku |
| 8227 | * | |
| 8228 | WB8GUN | Lambertville |

| Node ID | CallSign | Location |
|---------|----------|------------------------|
| 8232 | WA2CBS | New York |
| 8233 | N4XJQ | South Punta Gorda |
| 8237 | W2FCC | MOBILE NODE |
| 8240 | KR6WP | San Carlos |
| 8242 | W9OSL | Green Bay |
| 8247 | XE1YMY | Toluca |
| 8257 | N1CDT | Martinsville |
| 8260 | W6HY | Crescent City |
| 8265 | N3VSI | Edgewood |
| 8267 | KG6LIN | Thousand Oaks |
| 8269 | K7IZA | Las Vegas |
| 8270 | K4OBX | Hatteras Island |
| 8275 | N8NAP | Mobile |
| 8277 | N3VSI | Edgewood |
| 8280 | N16M | Clovis |
| 8281 | WH7BR | Volcano |
| 8283 | JG3IRL | Higashiosaka |
| 8285 | KB4PNG | Oneida |
| 8289 | XE2EOS | Tuxtla Gutierrez |
| 8300 | ZS5Z | Durban |
| 8308 | W2IRA | Medford |
| 8310 | KB5KZS | Bartlesville |
| 8317 | N4FOB | Port Charlotte |
| 8322 | K8KHW | Newport |
| 8324 | K4MJO | South Hill 2 M Simplex |
| 8327 | NY2SI | Staten Island |
| 8332 | JQ1YEG | Meguro-ku |
| 8350 | KC7TIG | Rathdrum |
| 8363 | KA2ZSA | MOUNT VERNON |
| 8365 | XE2LRD | Durango |
| 8369 | KF4LZA | Miami-Echolink #83690 |
| 8373 | WT4RA | Isle of Wight |
| 8376 | JK1ZRW | Sayama City |
| 8378 | XE2SI | Tijuana |
| 8380 | W9FEZ | Fort Wayne |
| 8390 | k7rmr | Ellensburg |
| 8409 | WA2ZST | Southampton |
| 8410 | WB6TCS | Oakland |
| 8420 | K6BIV | Pittsburg |

| Node ID | CallSign | Location |
|---------|----------|--------------------------------|
| 8424 | K16DES | San Antonio Winsystem Affiliat |
| 8427 | ZS0JPL | Pretoria |
| 8429 | XE2NHM | Allende |
| 8433 | W1GZ | Fitchburg |
| 8437 | J1BQW | Zama |
| 8440 | W5DEL | Oklahoma City WIN System |
| 8484 | KB3SDE | Philadelphia |
| 8499 | JS1LQI | Koto, Tokyo |
| 8500 | 9Y4AT | Valsayn |
| 8503 | XE3AYZ | SAN CRISTOBAL DE LAS CASAS |
| 8510 | KL3K | Girdwood MP 90 Seward Hwy. |
| 8520 | N2TLD | Lake Grove |
| 8522 | VP9RSB | Devonshire |
| 8524 | K0LAV | White Bear Lake |
| 8535 | ZU9DCM | Cape Town |
| 8536 | K40BX | Buxton |
| 8550 | AA8CC | Buckhannon |
| 8551 | JS1CYI | Komae-city |
| 8555 | ZS4B | Harrismith |
| 8562 | KD3SU | Boonsboro |
| 8566 | KW4GT | ORLANDO |
| 8578 | AA8RK | Ann Arbor |
| 8600 | PI2EHV | Eindhoven |
| 8611 | N1ACE | Tampa Bay |
| 8620 | PI6EHN | Eindhoven |
| 8623 | * | |
| 8626 | JA2VOF | Shizuoka city |
| 8628 | EA8EE | Las Palmas |
| 8629 | KC8MHK | Kalamazoo |
| 8632 | JQ1YFK | Minamikoma |
| 8635 | W4MEV | Richmond |
| 8643 | KC2RQR | Staten Island |
| 8645 | AB9OV | Chicago - Echolink 394-440 |
| 8648 | JF9LGL | Hakusan City |
| 8652 | K9NJS | LaBelle |
| 8654 | W7RAT | Cannon Beach |

| Node ID | CallSign | Location |
|---------|----------|--------------------------------|
| 8657 | KD3SU | Boonsboro |
| 8662 | ZS2PE | Port Elizabeth |
| 8672 | NN1D | Fall River |
| 8682 | NS1RA | Salem |
| 8691 | WA1NPO | Whitman |
| 8709 | K4RPT | Melbourne |
| 8717 | KCOMPD | Beverly Hills |
| 8719 | ZS0JPL | Pretoria |
| 8720 | WB5UGT | Houston - Saltgrass Link |
| 8730 | K6KYA | San Francisco - WIN System Aff |
| 8770 | KB7ZPL | Vancouver |
| 8774 | N4AED | Knightdale / ECHOIRLP 4630 |
| 8784 | KP20 | St. Thomas |
| 8789 | KF4LZA | Ft. Lauderdale-Echolink #87892 |
| 8794 | XE3DX | Tuxtla Gutierrez |
| 8796 | * | |
| 8798 | XE2GF | Tijuana |
| 8808 | W6TRI | Champaign |
| 8838 | KC4AAC | Palmer Station |
| 8847 | W2GGI | Delray Beach-EchoLink #88477 |
| 8851 | XE2SI | Ensenada |
| 8864 | AF6V | LA HONDA |
| 8866 | WD8IEJ | ARCHBOLD |
| 8884 | W1AEC | Dartmouth |
| 8892 | WB2ZEX | Brooklyn |
| 8895 | XE2LRS | Durango |
| 8906 | ZS6KTS | Kempton Park |
| 8910 | K4LX | St. Petersburg |
| 8913 | W9PXZ | Joliet |
| 8929 | N2QKV | Brick |
| 8930 | KBOWYT | Scottsbluff |
| 8937 | WH6FM | Hilo |
| 8939 | KG9F | Downers Grove |
| 8950 | MOHBK | Englefield Green |
| 8952 | XE1RCS | Ciudad de Mexico |
| 8954 | JN2UNC | Upper Nagoya City |
| 8993 | KB0P | Ishpeming |

ECHO LINK

Developed in early 2002 by Jonathan Taylor K1RFD, EdhoLink is a computer program using the Voice-over-Internet Protocol to establish long-distance communications (DX). The program has spread rapidly among the ham community and is today used by over 120,000 radio amateurs in 150 countries. Instead of using ionospheric layers to establish long-distance communications, K1RFD suggested to amateurs to use the Voice-over-Internet Protocol, using the Internet in combination with RF linking and especially with VHF and UHF FM transceivers to work other amateur stations.

EchoLink has four main user groups

Repeaters

(Eg, ZL3CAR-R) where a computer is connected to a local repeater by radio and any number of people in range of the repeater can use the system.

Links

(Eg. ZL2VBC-L) this normally means that there is a simplex radio link at the remote station, normally less range than a repeater station.

Home stations

(Eg. ZL3TMB) a ham's computer is connected to the Internet, normally this is a home station. Using headphone and a computer style microphone (no ham gear is required, just a call-sign).

Conference servers

(Eg *ZL1VK*) these are just a computer with a very fast Internet connection, no radio gear is required by a server. These servers allow many stations to connect together. The Papakura Radio Club operates an EchoLink conference server, *ZL1VK* (node 65001). Make sure you connect on Sunday nights from 7pm (New Zealand time) onwards. This server can be used to link computers, simplex radio links and repeater for running

local, nationwide or international nets. It is available for both open nets or private nets.

Operating Guidelines

Usual operating practice on EchoLink is to operate just as if you were on amateur radio. If any link station (call-sign-L) or repeater station (call-sign-R) are connected to the conference, you are on the radio. Be aware that other users may be anywhere in the world. Please use commonsense and courtesy. Specifically, pretend you are on a busy repeater. That means:

- Identify with your call-sign now and then. You don't need to ID every transmission.
- Leave a pause of a few seconds between transmissions. This gives others a chance to break in. It also lets linked radios and repeaters drop out, so they don't get timed out.
- If several people are active in conversations, consider turning it over to one specific station at the end of each transmission. Don't consider this mandatory, though. If there is a logical next

person to speak, let that person speak. If not, then a simple rule is to rotate speakers in a fixed order. (The on-screen station list makes this easy. It is kept sorted with the most recent speakers on top. So just turn it over to the station on the bottom, or the lowest station who is actively participating.)

- If you want to have a long conversation with one other station, and the subject is not going to be interesting to others, consider dropping out of the conference and connecting directly. If you talk about something interesting, please stay on the conference.

For more information and a copy of the software, check out any of the following links: <<http://www.echolink.org/>>; <<http://www.hamradio.co.nz/>>; <<http://www.qsl.net/zl1vk/>>; <<http://www.qsl.net/zl2ufi/>>.

The term 'Radiosport' – is widely used internationally these days when talking about amateur radio contesting. AR contests first started around 75 years ago and they now come in all shapes and sizes, from big international 48 hour marathons on six HF bands, to just a one hour 'sprint' with other ZLs on 80m. Apparently participation levels and interest in Radiosport contesting are on the rise, with most international HF contest organisers reporting significant increases in the number of contest logs received and participation numbers.

Contest operating – can provide great incentives and opportunities for improving operator technical skills, station equipment set-ups as well as actual on-the-air operating skills. Contests are great fun as well, as the basic object is of course to work lots and lots of other stations within a defined period. If you chase DX, then contests are also great occasions to improve your personal DXCC Award standings.

Contests can have various operating categories – some are single mode contests, others are multi-mode, eg. single-band, all-bands, CW-only, phone-only, RTTY-only, PSK-only, mixed-mode, QRP, low-power, high-power, single-operator, multi-operator and combinations thereof and there are heaps of certificates to be won to decorate your shack with. For instance in both the Phone and CW CQ WW Contests there are around twenty-five First-Place certificates available just for ZL stations!

Contest operating procedures – for contest newbies the best thing to do is listen to other stations to learn how it's done. There are just two type of contest contacts; either you reply to a station who is calling CQ, or you call CQ yourself and wait a reply from someone else. Make sure you're familiar with the rules for the particular contest before you start of course. Each contest has its own requirement of what information should be exchanged between stations. This 'Exchange' often just consists of an RS(T) report and a 'Serial Number', starting with 001 and incrementing by one for each contact. In some contests the Serial Number is replaced by other information, such as CQ or ITU Zone Numbers, transmit power level or operator age.

The Internet – is a very useful source of AR contesting information. All international contests have a few web pages where the rules and other helpful information about the contest such, as the results of past years are available. Other web pages provide contest calendars with links to contest rules and other general contesting information. For example:

www.sk3bg.se/contest/index.htm
www.hornucopia.com/contestcal

<http://www.ng3k.com/contest/>
<http://www.contesting.com/>

Contest log-keeping – was once a pen and paper job, but now thankfully most of us have computers that can help us. No matter how big the contest is, or how many contacts you make,

using a computer should make life easier for you and especially the person who has to check and adjudicate your log. Many international contest organisers no longer accept paper logs.

A contest logging software programme – is the best and simplest way to log your contacts. Logging software programmes have been around for a long time now and they come in two types. General logging programmes that are designed for day-to-day general log keeping and contest logging programmes which are dedicated to contest operating only and which thus contain many useful neat features that general logging programmes don't need and don't have. These programmes will not only keep a log of all your contacts, they will do the scoring for you and at the end of the contest you can save a file of the contacts which can be emailed directly to the contest organisers.

The first contest logging programmes were DOS-based, but now Windows programmes are more popular because they are more user friendly and have more features. N1MM Logger is the most popular Windows programme and is completely free. The programme web-site is www.n1mm.com Personally I have been using this programme for the past nine years since the first version of this programme was released in 2001 and really recommend it. Two other Windows programmes are Writelog and WinTest, but neither of these are free. Various free older DOS type programmes, such as SD, CT and TRlog are also

still available.

Rig Control – The most basic function of a contest logging programme can be used by merely typing in the callsign and exchange details of each contact as you make them, the programme will take care of the date and times. But the programmes are capable of doing a lot more, when a computer-transceiver connection is used. The programme will be able to key your transceiver and transmit recorded contest exchange information, the programme will always know frequency and mode your transceiver is on and enter these details in the contest log, plus a few more useful tasks and features will become available. This computer-transceiver connection is commonly called 'rig-control'. The connection is usually done via Serial COM port or USB cables, plus for digital modes and SSB modes you may need additional audio receive or transmit or both receive and transmit connections. Most transceivers but not all, need some sort of interface, which can be a simple homebrew one or a commercial one. The N1MM Logger programme Help Files and your transceiver manual will show how these connections are done.

On the following pages, there is a summary list of the New Zealand AR contests, a basic month by month calendar of the more popular international contests, plus the rules for various NZ contests.

NEW ZEALAND HF AR CONTESTS

| Contest | Comments | When – weekends | Sponsor |
|--|---|--|---|
| Jock White Memorial Field Day | A contest and activity event for club & individual FD stations, CW & SSB on 40m & 80m | 4th February | NZART |
| Thelma Souper Memorial | 80m, refer WARO column in Break-In for details | 2nd April | NZART (WARO) |
| Kiwi Digital Modes Group RTTY | RTTY on 80m | 80m–3rd Sat April 40m–4th Sat April | Kiwi Digital Modes Group |
| Sangster Shield | CW only on 80m only, good contest for QRP & new operators | 3rd May | NZART |
| Memorial | The premier ZL domestic contest, 80m only, CW & SSB | 1st July | NZART |
| Waitakere Sprints | A pair of quick, fun, one-hour contests on 80m | SSB–last Sat July CW–first Sat Aug | Papakura Radio Club |
| Doug Gorman Memorial Frequency Measurement | Frequency measuring activity on 80m | 1st Mon September | Wellington VHF Group on behalf of NZART |
| Nostalgia Night | An activity evening for old-time radios & their custodians! | 1st Sat September | SPAM–Society for the Preservation of Amplitude Modulation |
| Oceania | Our own premier international HF contest is very well supported by non-Oceania stations | SSB–1st October CW–2nd October | Oceania Contest Committee on behalf of NZART and WIA |
| Straight Key Night | Some back to basics fun | 1st Sun November | ZLAIH |
| Kiwi Digital Modes Group Twin Sprint | PSK & RTTY on 80m | 1st December | Kiwi Digital Modes Group |

RULES FOR 2010 OCEANIA DX CONTEST

1. SPECIAL NOTES for the 2010 Contest:

- The SINGLE-OP entry category has been split into High Power (SINGLE OP HP) and Low Power (SINGLE OP LP) categories. Total output power must not exceed 100 Watts in the Low Power category. Rule 7 has been updated to reflect this change.
- The MULTI-SINGLE entry category has been deleted. It is replaced by the MULTI-ONE and MULTI-TWO entry categories. Rules 7 and 8 have been updated to reflect these changes.
- Rule 6 has been updated to clarify that only one entry may be submitted by each operator or team of operators.
- All email logs are processed by an email robot. The robot sends an automated email acknowledgement indicating either acceptance or rejection of the log. If you do not receive this acknowledgment, or are encountering difficulty in having the log accepted, then please contact the Contest Committee at info@oceaniadxcontest.com
- Electronic logs are to be in Cabrillo format which is now generated by all popular contest logging software programs. Alternatively entrants can use the forms at <http://www.b4h.net/cabforms/> to manually create and submit a Cabrillo file.
- Portable prefixes must be inserted in front of the home callsign, e.g., W1XXX operating in ZL1 would sign as ZL1/W1XXX.
- If the station worked does not provide a serial number, then log the received number as 001. See rule 8. This new provision allows credit for contacts with stations that are not in the Oceania DX Contest.
- A reminder that Single-Op Single Band logs must record ALL contacts made by the station—both on the band chosen for the entry and on any other bands.
- Stations must log a minimum of 10 contacts to be eligible for an award.

2. CONTEST PERIODS:

PHONE Contest: 08:00 UTC Saturday 2 October to 08:00 UTC Sunday 3 October 2010

CW Contest: 08:00 UTC Saturday 9 October to 08:00 UTC Sunday 10 October 2010

- ## 3. THE AIM
- of the contest is to promote HF contacts with stations in the Oceania region (VK, ZL, Pacific Islands and other locations within the IARU "Worked All Continents" Oceania boundary).

4. THE OBJECT

- is for:
- Oceania transmitting stations to contact as many stations as possible both inside and outside the Oceania region.
 - Non-Oceania transmitting stations to contact as many stations as possible inside the Oceania region. There is no penalty for working non-Oceania stations but contacts between non-Oceania stations will score no points or multiplier credits.
 - Oceania receiving (SWL) stations to copy as many contest stations as possible both inside and outside the Oceania region.
 - Non-Oceania receiving (SWL) stations to copy as many contest stations as possible inside the Oceania region.

5. BANDS:

160M – 10M (no WARC bands).

6. TERMS OF COMPETITION FOR ALL CATEGORIES

- Only one entry is allowed for each operator or team of operators.
- A different call sign must be used for each entry.
- High power entrants must not exceed 1500 watts total output power, or the maximum permitted output power in their country, whichever is less, on any band.
- QSO alerting assistance (e.g., packet spots) is allowed in all entry categories, but self-spotting, asking other stations to spot you, or any other form of soliciting QSOs is not allowed.
- All of an entrant's transmitters and receivers must be located within a 500-meter diameter circle or within the property limits of the station licensee, whichever is greater. All antennas must be physically connected by wires to the transmitters and receivers used by the entrant.
- Remote operation is permitted. The entry location of a remote station is determined by the physical location of the transmitters, receivers, and antennas. A remote station must obey all station and category limitations.

7. ENTRY CATEGORIES

- Single Operator Low Power (SINGLE-OP LP): Either All Band or Single Band. One person performs all of the operating and logging functions. Total output power must not exceed 100 watts. Only one transmitted signal is permitted at any time.

- Single Operator High Power (SINGLE-OP HP): Either All Band or Single Band. One person performs all of the operating and logging functions. Only one transmitted signal is permitted at any time.
- Multiple Operators and Single Transmitter (MULTI-ONE): More than one person can contribute to the final score during the contest period. Only one transmitted signal is permitted at any time. A maximum of ten (10) band changes may be made in any clock hour (00 through 59 minutes). For example, a change from 20 meters to 40 meters and then back to 20 meters counts as two band changes. Use a single serial number sequence for the entire log.
- Multiple Operators and Two Transmitters (MULTI-TWO): More than one person can contribute to the final score during the contest period. A maximum of two transmitted signals is permitted at any time on different bands. Either transmitter may work any and all stations. A station may only be worked once per band regardless of which transmitter is used. The log must indicate which transmitter made each QSO. Each transmitter may make a maximum of eight (8) band changes in any clock hour (00 through 59 minutes). For example, a change from 20 meters to 40 meters and then back to 20 meters counts as two band changes. Use a separate serial number sequence for each band.
- Multiple Operators and Multiple Transmitters (MULTI-MULTI): More than one person can contribute to the final score during the contest period. No limit to transmitters, but only one transmitted signal (and running station) allowed per band at any time. Use a separate serial number sequence for each band.
- SWL: Short Wave Listener (Receive Only), All Band.

8. EXCHANGE:

RS(T) report plus a progressive contact serial number starting at 001 and incrementing by one for each contact. MULTI-TWO and MULTI-MULTI entries must use a separate serial number starting at 001 for each band. If the station worked does not send a serial number, then the received number is to be logged as 001.

9. MULTIPLIER:

The multiplier is the number of different valid prefixes worked. Note that the same prefix may be counted once on each band for multiplier credit.

A prefix is the letter/numeral combination that forms the first part of the amateur call—the same as the CQ WPX contest definition.

Examples of valid prefixes are N8, W8, WD8, HG1, HG19, KC2, OE2, OE25, etc. Any difference in the numbering, lettering, or order of the same shall constitute a separate prefix. A station operating from a DXCC country different from that indicated by its callsign is required to sign portable. The portable prefix must be an authorized prefix of the country/call area of operation. In cases of portable operation, the portable designator will then become the prefix. Example: N8BJQ operating from Wake Island would sign KH9/N8BJQ or NH9/N8BJQ. KH6XXX operating from Ohio must use an authorized prefix for the U.S. 8th district (W8, K8, etc.) Portable designators without numbers will be assigned a zero (0) after the second letter of the portable designator to form the prefix. Example: PA/N8BJQ would become PA0. All calls without numbers will be assigned a zero (0) after the first two letters to form the prefix. Example: XEFTJW would count as XE0. Maritime mobile, mobile, /A, /E, /J, /P, or interim license class identifiers do not count as prefixes.

Special event, commemorative, and other unique prefix stations are encouraged to participate. Prefixes must be assigned by the licensing authority of the country of operation.

10. CONTACT POINTS:

Each QSO is credited twenty points on 160M; ten points on 80M; five points on 40M; one point on 20M; two points on 15M; and three points on 10M. Note that the same station may only be counted once on each band for contact points.

11. THE FINAL SCORE is the sum of the Contact Points multiplied by the Multiplier (the total number of prefixes worked on all bands, noting that the same prefix can be counted once on each band).

12. AWARDS

Each station must log a minimum of 10 contacts to be eligible for an award.

Certificates will be awarded to the top scoring station in each category listed under Section 7 for each IARU WAC continent and each country. A special participation certificate will be awarded to every station that makes at least 100 QSOs in either the PHONE or CW sections of the contest.

The trophies and plaques in the following table will also be awarded.

| Award | Recipient | Sponsor |
|--|---|---|
| OCEANIA Ron Wills ZL2TT Memorial Trophy | Top entrant from Oceania in PHONE Single Operator ALL Band category | ZL2GI, ZL2AL, Wellington Amateur Radio Club and NZART |
| AUSTRALIA Single-Op ALL Band PHONE Plaque | Top entrant from Australia in PHONE Single Operator ALL Band category | VK3VTH |
| AUSTRALIA Frank Hine VK2QL Memorial Trophy | Top entrant from Australia in CW Single Operator ALL Band category | WIA Federal |
| AUSTRALIA Club Plaque | Local club from Australia with the greatest number of member stations participating in the Oceania DX Contest | VK Contest Club |
| ASIA Single-Op ALL Band PHONE Plaque | Top Entrant from Asia in PHONE Single Operator ALL Band category | VK8PDX (ex-VK5HRT) |
| ASIA Single-Op ALL Band CW Plaque | Top Entrant from Asia in CW Single Operator ALL Band category | W3SE / ZL3TE |
| NORTH AMERICA Single-Op ALL Band PHONE Plaque | Top Entrant from North America in PHONE Single Operator ALL Band category | N6RO |
| NORTH AMERICA Single-Op ALL Band CW Plaque | Top Entrant from North America in CW Single Operator ALL Band category | Oceania Amateur Radio DX Group Inc |
| EUROPE Single-Op ALL Band PHONE Plaque | Top Entrant from Europe in PHONE Single Operator ALL Band category | Oceania Amateur Radio DX Group Inc |
| EUROPE Frank Vander Drift VK3COF Memorial Plaque | Top Entrant from Europe in CW Single Operator ALL Band category | VK6DXI |

Note: Both Low Power and High Power entries are eligible for the Single Operator ALL Band awards in the above table.

Awards may be withdrawn or added at any time, and at the discretion of the Contest Committee. Refer to the Oceania DX Contest web site at www.oceaniadxcontest.com for the latest information about contest awards.

13. GENERAL LOG REQUIREMENTS:

Transmitting entries are to submit a log showing the following details for each contact—band or frequency, mode, date, time in UTC, callsign of station worked, RS(T) and serial number sent, RS(T) and serial number received. SINGLE-OP Single Band logs are to record ALL contacts made by the station—both on the band chosen for the entry and on any other bands. All logs must be submitted in date/time order.

SWL entries are to submit a log showing the following details for each contact—band or frequency, mode, date, time in UTC, callsign of 'station heard', callsign of 'station being worked', RS(T) and serial number sent by the heard station. The same callsign may appear only once in any group of 3 consecutive entries in the 'station being worked' column. Note that in the case of non-Oceania SWL entries, only Oceania callsigns should appear in the 'station heard' column.

All duplicate contacts must be shown—DO NOT delete duplicate contacts. No penalty will be applied for showing duplicate contacts.

14. ELECTRONIC LOGS are preferred and are compulsory for stations logging more than 50 contacts.

Electronic logs are to be submitted in Cabrillo format. The Cabrillo log file must include an accurately completed header (containing the summary information) and the QSO log data. All of the fields in the Cabrillo header must be completed except for the ARRL Section, Category Overlay and Soapbox lines. Failure to fill out the header correctly can result in the entry being placed in the wrong category or reclassified as a check log. See www.oceaniadxcontest.com for the latest information on the Cabrillo log format requirements.

The log file name is to be in the form callsign.log, for example, if ZL2WB submits a log file—then it should be named zl2wb.log.

Send the log file as an e-mail attachment to ph@oceaniadxcontest.com (for PHONE entries) or cw@oceaniadxcontest.com (for CW entries). Please insert only your callsign in the Subject field of the e-mail used to send your Cabrillo log. The log file must be sent as an attachment, not as text or other content within the e-mail message. Do not zip the log file and only include one log in each email submission.

All incoming email log messages are processed by an email robot. The robot sends an automated email acknowledgement indicating either acceptance or rejection of the log. If you do not receive this acknowledgment, or are encountering difficulty in having the log accepted, then please contact the Contest Committee at info@oceaniadxcontest.com.

Note: SWL files cannot be processed by the robot so please forward all electronic SWL files to info@oceaniadxcontest.com.

Entrants using paper logging, or logging software that does not produce a Cabrillo file, are encouraged to use the on-line forms at <http://www.b4h.net/cabforms/> to manually create and submit a Cabrillo file.

15. PAPER LOGS:

Electronic Logs are preferred (see Rule 14 above) but if this is not possible then paper logs in the Oceania DX Contest format may be

submitted, provided they contain less than 50 contacts. Each paper log is to be accompanied by a summary sheet that clearly states:

The station's callsign

Operator callsign/s

Entrant's name and mailing address (for receipt of awards)

Mode and Category entered

Contact points claimed on each band

Number of multiplier prefixes claimed on each band

Total claimed score

Official log sheets and summary can be downloaded from the Oceania DX Contest website at www.oceaniadxcontest.com. If you do not have access to the official forms then you may make your own in accordance with the general requirements outlined above and in Section 13.

Paper logs are to be posted to: Oceania DX Contest, c/o Wellington Amateur Radio Club Inc., PO Box 6464, Wellington 6030, New Zealand. Only one entry is to be included in each submission. Airmail is preferred if you are submitting a log from outside VK or ZL.

16. DEADLINE:

All logs must be emailed or postmarked NO LATER than 8 November 2010. The reception of logs will be acknowledged by the email robot (for electronic submissions) and a listing of all logs received by the robot will be posted on the Oceania DX Contest web site at www.oceaniadxcontest.com.

17. DISQUALIFICATION

Violation of amateur radio regulations in the country of the contestant or the rules of the contest; unsportsmanlike conduct; or taking credit for excessive unverifiable QSOs or multipliers will be deemed sufficient cause for disqualification. Incorrectly logged calls will be counted as unverifiable contacts. ANY entrant that uses means, other than contacts on the permitted bands and modes, to SOLICIT, ARRANGE, or CONFIRM any contacts during the contest is unsportsmanlike and the entry will be subject to disqualification.

18. DECLARATION

Although no signed declaration is required, by submitting a log you are deemed to have agreed that: 1) you have read and understood the rules of the contest and agree to be bound by them, as well as all rules and regulations of your country which pertain to amateur radio, 2) your log entry may be made open to the public, and 3) all actions and decisions of the Oceania DX Contest Committee are official and final.

19. FURTHER INFORMATION

The latest information about the contest will be published on the Oceania DX Contest web site at www.oceaniadxcontest.com. Any questions can be emailed to info@oceaniadxcontest.com or posted to Oceania DX Contest Committee, c/o Wellington Amateur Radio Club Inc., PO Box 6464, Wellington 6030, New Zealand.

JOCK WHITE MEMORIAL FIELD DAY CONTEST

This annual contest is named to honour Jock White ZL2GX, NZART Contest and Awards Manager for over 40 years, for the service that he gave to NZART during that time. This contest, like many others, results from Jock's initiatives. Home stations are now valid contacts in this contest and are encouraged to have a minimum of 50 phone or 25 CW QSOs and to submit a log entry. The minimum numbers apply to the band being used or 50 and 25 on each band if on both bands. This contest is primarily to test Branch organisation and weld a team of workers together. There is work for all members — XYLs, OM's, YLs and SWLs.

Of Special Significance:

1. The term "Branch Points" replaces the more common term "multiplier" in these rules.
Refer rule 14.2. There is no change in concept, just a name change.
2. The minimum number of contacts for a field station to qualify as "Branch" points for other stations is 50 on Phone or 25 on CW. Refer rule 14.2.4.
3. Restrictions applying to the use of linear amplifiers are given in rule 7.1. Complaints about the use of linear's will be investigated.
4. Team leaders should ensure that all of the team understands the rules and that newcomers are assisted with their operating technique.
5. Stations should be operated within the amateur "codes" as regards procedures, equipment, operating speeds etc.
6. Have you considered entering the QRP section?
7. Rule 15.4 has been amended so that signing of logsheets by the operator is not compulsory. This has been changed because of difficulties in doing this with computer logging. However, it is essential that the operators check the log after their period of operation.
8. Rule 16.2.2 has been amended to include email address alongside of certificate address. Results can be sent to the email address given.

Rules

1. WHEN: The last full weekend in February each year: Saturday 0200 — 1100, 1700 — 2400 UTC. (1500 — 2400 NZT) Sunday 0000 — 0200 UTC (0600 — 1500 NZT).

2. Bands: 40 and 80 metres.

2.1. Simultaneous operation on 80 and 40 metres is permitted provided that only one receiver/transmitter is operational on any one band at any one time. Single receiver/transmitters may be used on one or both bands.

3. Modes and Contacts:

3.1. Modes to be used are phone and CW. Phone to CW contacts are not permissible.

3.2. Home stations will identify themselves as such and field stations will identify themselves as such.

4. Sites/Shelter: All equipment (except generators) to be under the same shelter. For field stations the shelter to be a tent (one or more tents within 10 metres of each other) erected on the weekend of the contest, mobile home or other vehicle (moved on to the site on the weekend of contest).

5. Antennae: for field stations to be raised no earlier than 2300 UTC on the Friday (1200 NZT on the Saturday). This takes into account that some may chose to erect antennae supports while others may use natural or standing supports. eg. hills, trees, towers, buildings etc.

6. Power: for field stations must be from a source independent of the AC or DC mains, ie. all power must be from batteries/ engine alternator/vibrator/solar source/wind generator etc.

7. Contest Sections: One section of the contest may be entered by any one station although that station may qualify for more than one section.

7.1. Open sections: The maximum output power from the transmitter final amplifier must not exceed the legal limit given in the Radio Regulations. Linear amplifiers may only be used to increase the power output of low power transmitters (eg 5 – 30 Watts) to the equivalent of a typical transmitter (ie nominal 100/150 Watts). These sections are for stations in the appropriate region or category. The trophies stated will be awarded to the highest scoring station in the section. Certificates will be issued to the winners of each section plus place getters as warranted by entry numbers.

Field Stations

7.1.1. Northern Region Section (Montgomery Cup)

7.1.2. Central Region Section (Patea Shield)

7.1.3. Midlands Region Section (ZL3/4 Trophy)

7.1.4. Southern Region Section ('4' Trophy)

7.1.5. Single Operator Section – operation unaided by any other person.

7.1.6. CW Only Section – operation on either band or both bands CW only.

7.1.7. Phone Only Section – operation on either band or both bands phone only.

7.1.8. Other Power Section – power source solar, wind generator, water etc.

7.1.9. 80 Metres Only Section – operation on 80 metres only.

Home Stations

7.1.10. Northern Region Section

7.1.11. Central Region Section

7.1.12. Midlands Region Section

7.1.13. Southern Region Section

7.1.14. Overseas Section.

A certificate will also be awarded to the overall highest scoring home station.

7.2. QRP Section (W M Hall Memorial Cup): The maximum output power from the final amplifier of the field station must not exceed 5 watts.

8. Operators. The station should be operated by members of NZART except that operators being introduced to NZART and helpers need not be members. Indicate accordingly on the summary sheet.

9. Mobile Stations: are eligible for contest purposes as field stations for contacts made from within one branch area only. The branch number used will be that of the area where the station is operated.

10. Exchanges:

10.1. The exchange should consist of report and serial number/ branch number. eg. 59001/11 on phone and 599001/11 on CW.

10.2. Serial numbers will commence at 001 and increment by one for each contact.

10.3. Where simultaneous operation is used a separate serial number series will be used for each band.

10.4. Phone and CW numbers on one band are from the same number series.

11. Branch Number: is the NZART Branch number for the area in which the field station is operated except that stations may move a few kilometres from their home area to a suitable location. eg. city to country. Home stations will use the Branch number 00.

11.1. If the field station chosen location is within another Branch area care must be taken not to clash with the other Branch station. The onus is on the 'moved' station to ensure that there is no clash.

11.2. The Branch number of Branches in recess may be used.

12. Contest Periods:

12.1. There will be 18 periods between the even hours. eg. 1500 – 1600, 1600 – 1700, etc.

12.2. Contacts may be made with any field, ZL home or 'overseas' (refer rule 13) station once each period on each mode on each band. ie. on 80m: once on phone and once on CW, and on 40m: once on phone and once on CW, each period.

12.3. The contacts with any one station on phone and CW on one band in a period, or on one mode at the end of one period and commencement of the next, may not be sequential except where 5 minutes have elapsed between those contacts.

13. "Overseas" Stations: are those located outside the New Zealand mainland, and in the South Pacific region. The prefixes that are eligible are: all VK, ZL5, 7, 8, 9, A3, FK, FO, FW, H4, P2, YJ, 3D2, 5W.

14. Scoring: The final score will be the total of contact points (80m + 40m) x total Branch Points.

14.1. Contact points:

ZL phone 3 per contact

ZL CW 5 per contact

Overseas phone or CW 10 per contact

14.2. Branch Points (multiplier):

14.2.1. One Branch point is claimed for each Branch contacted on each band and mode. eg. one Branch point for contacting Branch 01 on 80 m phone, two Branch points for contacting Branch 01 on 80 m Phone and 40 m Phone or 4 Branch Points for contacting Branch 01 on 80 m Phone and CW plus 40 m Phone and CW, etc. Enter one callsign in the appropriate summary sheet and total the columns to get a Branches number for summary sheet one.

14.2.2. Only one station from a branch may be claimed as a Branch

point for a mode on one band. However, where a Branch has more than one station active different stations contacted may be claimed for the other band or mode.

14.2.3. Stations using the same Branch number may contact each other for contact points but not for Branch points.

14.2.4. To qualify as Branch points for other stations, a field station must have a minimum of 50 contacts on Phone or 25 contacts on CW on each band that the station is active on. eg. if active on 80 m Phone, must have 50 contacts to count as one Branch point, if active on 80m Phone and CW, must have 50 contacts on phone and 25 contacts on CW to count as two Branch points, etc.

15. Logs

15.1. One log per station in order of time, except that where simultaneous operation is used one log per band is required.

15.2. Head each page with the call, Branch or HS for home station and the page number.

15.3. Log sheet layout order: date/time/station contacted/CW or PH/band/exchange sent/exchange received. NZART log sheets are preferred. Entry in the points column is not required as totals are done from a summary, but the points column can be used for checking purposes. A total of PH/CW/DX contacts on each page is useful for counting purposes.

15.4. Use a separate logsheet per period, except that where there are very few contacts per period, several periods (ruled off between periods) can be on one sheet.

15.5. Highlight or underline each contact claimed as a multiplier.

15.6. Check for accuracy and rule through any duplicate contacts in a period.

16. Summary.

16.1. The summary and final score details are to be on the 'Jock White Memorial Field Day' summary forms provided to Branch secretaries each year and also available from NZART HQ and the NZART website <<http://www.nzart.org.nz/nzart/update/contests>>.

16.2. Summary Sheet 1 contains:

16.2.1. Callsign used Branch name & number or HS for home station

16.2.2. Postal address for certificates and email address for results

16.2.3. Section entered (one only)

16.2.4. Names & Calls of operators/assistants

16.2.5. No. of 80 m phone contacts

No. of 80 m CW contacts

No. of 80 m overseas contacts

16.2.6. No. of 40 m phone contacts

No. of 40 m CW contacts

No. of 40 m overseas contacts

16.2.7. Calculation of contact points

16.2.8. Branch points claimed for 80 phone

Branch points claimed for 80 CW

Branch points claimed for 40 phone

Branch points claimed for 40 CW

Total Branch points

16.2.9. Total points claimed (contact points x total Branch points)

16.2.10. List transceivers/generator etc/power output

16.2.11. Certification of power output and rule observance by two operators (except for single operator stations)

16.3. Summary Sheets 2 and 3 contain a table for listing the CALLSIGN of the station claimed as a Branch point for each branch on each band and mode. Count the number in each column and transfer the figure to summary sheet 1.

17. Closing Date: Logs should be posted to reach Stuart Watchman, 33 Brooklyn Drive, Blenheim by the Saturday which is four weeks after field day Saturday. eg. If Field Day is held February 23/24, logs to be received by 24 March (in a non – leap year). Late logs will not be eligible

NZART MEMORIAL CONTEST

To commemorate those New Zealand amateur radio operators who lost their lives in World War 2.

1. When:

First weekend in July, 2000 – 2300 NZST Saturday and Sunday. Three one-hourly operating periods each evening.

2. Bands:

80m only–A station may be contacted twice during each operating period – once on phone and once on CW provided that contacts are not consecutive.

3. Operator Categories:

Single-operator CW only, Phone only, or both CW & Phone and SWL

4. Exchange:

RS(T) report plus a three digit serial number starting at 001 for the first contact and incrementing by one for each subsequent contact.

5. Scoring:

A. Contact points:

Phone – One point per contact

CW – Two points per contact

B. Multipliers:

Each different callsign prefix worked, Phone and CW is a multiplier. (eg. a ZL4 worked on both Phone & CW counts as two multipliers).

C. Scoring:

The final score is the sum of the contact points multiplied by the number of different multiplier prefixes worked.

6. Logs:

The official log sheets can be downloaded from NZART web site and are also available from the NZART Business Manager. Logs must show contacts in correct order of time. Do not group all ZL1, ZL2, ZL3 etc. contacts together.

7. Summary Sheet:

A separate summary sheet, also available from the NZART web site, must be completed and attached to the log sheets. This must show the following:

A. Callsign of station and NZART Branch of which a member.

B. Name and full address of operator.

C. Section in which competing:

- Open phone and CW (Memorial Trophy),
- Open CW only (Auckland CW Cup),

- 'Beginners' CW only (Laing-Smith Cup). Competitors in this section must state the number of their operator's certificate and the date of issue,
- Low power phone and CW (Mannell Trophy),
- Home-made SSB equipment (Brother John Rodgers Plaque),
- Phone only (Phil Armstrong Plaque),
- Listeners section: Rules as for the transmitting sections except that only the exchange sent by that station heard should be given. The callsign of the station heard and also of the station being 'worked' must be stated.
- Australian section: Rules as for the Open section.

D. Brief description of equipment used and power output.

E. Points Summary:

| | CONTACTS | | CONTACT POINTS | | NUMBER OF PREFIXES | |
|--------|----------|-----|----------------|---|--------------------|---------------|
| PHONE | | X1= | | | | |
| CW | | X2= | | | | |
| TOTALS | | | | X | | |
| | | | | | | CLAIMED SCORE |

Plus a list of prefixes worked

F. Signed declaration that the contest rules and Radio Regulations have been observed.

8. Log Submission:

All logs with summary sheets should be sent to NZART Contest Manager, Frank Hunt ZL2BR, 8 Manu Crescent, New Plymouth 4310, to arrive no later than four weeks after the contest date. Logs as email attachments in either Word, Excel or plain Text format sent to zl2br@ihug.co.nz are also accepted.

9. Trophies:

Memorial Trophy

Donated by NZART in 1946. To be held for 12 months by the competitor with the highest score. Phone and CW may be used but contacts must be phone to phone or CW to CW. Phone to CW

or vice versa is not permitted. A miniature is also awarded with the trophy, becoming the winner's personal property.

Auckland Shortwave Cup

Donated by the Auckland Shortwave Club in 1933 for Morse competitions. To be held for 12 months by the competitor operating CW only, who returns the highest score. Contacts must be CW to CW. Power limit is 150 Watts.

Laing-Smith Cup

Donated by Mr L E Laing-Smith ZL1BO in 1958. To be held by the competitor returning the highest CW score who, at the time of the contest, has held an amateur operator's certificate for no longer than 12 months. Contacts must be CW to CW. Power limit is 150 Watts. This is to encourage CW operation amongst new hams. To quote ZL1BO 'Any method of inducing or encouraging the new hams to use CW until they are at least proficient' has my support.

Mannell Trophy

Donated by Mrs Mannell in memory of her son, who was killed in an aircraft accident while serving with RNZAF. To be held for 12 months by the competitor using a power not exceeding 10 Watts who returns the highest score. Phone and CW may be used but contacts must be phone to phone or CW to CW.

Ron Gray Memorial Shield

Presented by Mr And Mrs D Gray and Jock White ZL2GX in memory of Ron ZL1304, who was a regular competitor in the Listeners' Section, for the highest SWL score.

Brother John Rodgers Memorial Plaque

Presented by a group who appreciated his contribution to the hobby. For the competitor with the highest score using home-brew SSB transmitting equipment.

Phil Armstrong ZL1BMC (VK7MC) Memorial Plaque

To be held on an annual basis by the competitor with the highest score on phone only. All contacts must be phone to phone

NZART SANGSTER SHIELD CONTEST

Presented to the amateurs of New Zealand by Mr R. Sangster in 1927, the Sangster Shield is for annual competition to be won by the most efficient station. In this respect it should be pointed out, that in addition to the efficiency of the equipment used, the efficiency of the operator is of the utmost importance. To win this contest marks an operator as one who not only knows how to obtain the most effectiveness from low power but also one who is most proficient in the art of telegraphic communication.

Rules

1. When:

Third full weekend of May each year, between the hours of 2000 NZST and 2300 NZST on each evening. The maximum period of operation will be six hours.

2. Power: To compete for the Sangster Shield and Trophies the output of the transmitter must not exceed 5 Watts.

3. Mode: CW only

4. Band: 80 m only

- To give QRP contestants a fair chance (particularly with DX stations) higher power stations are requested to operate above 3530 kHz

5. Exchange:

- RST followed by branch number followed by power output – eg 569/11/04. indicating a 569 report; branch 11; and power of 4W. Power will always be given as two figures: over 100W will be given as 99, while below 10W will be preceded by 0.
- Overseas stations are required to give RST plus a serial number beginning at 001.

6. Contacts:

- Valid contacts are those between two ZL stations or between ZL and overseas stations, contacts between two overseas stations are invalid.
- QSOs with any one station are permitted once only each half hour, based on an "even half hour" basis, eg 2000 to 2030, 2031 to 2100 etc.
- It is not permissible to claim QSOs with the same station "twice running", i.e. at the end of one half hour period and at the beginning of the next, unless a different station is contacted by one of the two stations between QSOs, or a time delay of at least five minutes elapses between QSOs.

7. Entrants:

All ZL entrants must be financial members of NZART, except for first time entrants qualifying for the Transistor Trophy.

8. Logs:

- A4 size paper – preferably NZART log sheets.
- Data in this order: Date, Time, Station Call-sign, Exchange Sent, Exchange Received, Points Claimed.
- On a separate sheet a summary to show:
Entrant's callsign, name and address in BLOCK LETTERS.
Number of contacts with stations using 5W or less.
Number of contacts with stations using 6W or more.
Number of contacts with overseas stations.
- List of different branches worked with the number and name of each branch as given in the Call Book (in branch number order) plus the callsign of the station claimed for that branch.
- Total score – (total points multiplied by the number of branches

worked).

- Description of equipment, antenna and output power used.
- Signed declaration that all contest rules have been observed.

9. Scoring:

For ZL stations:

ZL to Overseas – 10 points

ZL to ZL with Power given as 5 W or less – 5 points.

ZL using 5W or less to ZL with Power given as 6W or more – 1 point

ZL using 6W or more to ZL with Power given as 5W or less – 1 point

ZL using 6W or more to ZL with Power given as 6W or more – not permitted for contest purposes.

For Overseas stations:

Overseas using 5W or less to ZL with Power given as 5W or less – 10 points.

Overseas using 5W or less to ZL with Power given as 6W or more – 5 points.

Overseas using 6W or more to ZL with Power given as 5W or less – 5 points.

Overseas using 6W or more to ZL with Power given as 6W or more – not permitted for contest purposes.

10. Final score:

Total points multiplied by the Number of Branches worked. Note: Contacts with a Contestant's own Branch are OK for points but are not to be counted as a multiplier.

11. Mobile or Mobile/Portable operation:

Will be permitted for New Zealand stations, however, the station must be operated from one location each evening. This means a station could operate from one location the first evening and another location on the second evening. The station must use the Branch number applicable to its location at the time. The entrant may combine both logs for contest purposes, but the logs must indicate their locations on both evenings. In this case then only one branch (either) is to be eliminated as an "own Branch" multiplier.

Overseas Stations may be mobile or portable, but a maritime mobile station must be outside New Zealand's territorial waters to be counted as a DX contact.

12. Discounted Contacts:

It is expected that participating stations will provide a fair chance for all entrants to make contact with them. While it is not intended to discourage contestants from operating only part of the full contest it is considered that at least 20 contacts should be made and station operation should be over at least three half-hour operating periods. Stations considered to have worked less than this requirement will have their contacts and branch multiplier contribution deducted from contest logs.

13. Awards:

Sangster Shield: to the highest scoring entrant using 5W or less and observing the rules as enumerated. (Note that all first time entrants qualifying for the Transistor Trophy will also be eligible for the Sangster Shield Award)

Transistor Trophy: to the highest scoring entrant using 5W or less and observing the rules as enumerated, but in addition who has

been licensed for 12 months or less. Entrants must give Operator's Certificate number together with date of issue.

Arthur Stevens Trophy: will be presented to the highest scoring South Island entrant using 5W or less. (This trophy is in honour of Arthur, formerly ZL1MT, a very long time stalwart of the Sangster Shield Contest).

- Certificates to the first three entrants using 5W or less, also to the first three "newly licensed" entrants qualifying for the Transistor trophy.
- Certificate to entrant using 6 W or more with the highest score.
- Certificates to Overseas entrants with the highest score in their respective call areas.

- Certificate to the branch with the highest aggregate score from three entrants operating in the QRP section. A minimum of three entrants are required to be eligible for this section. The top three scoring entrants for any Branch will automatically be aggregated – it is not necessary for a Branch to send in an entry for this section.

14. Logs:

Must be posted to reach the Contest Manager, Glenn Kingston ZL2KZ, 53 Tannadyce Street, Wellington 6003, on or before the third Thursday of June.

WAITAKERE SPRINTS CONTEST

The Papakura Radio Club Inc. is pleased to announce that the Waitakere Sprints will continue. The Sprints will be the same as previously held, the Phone Sprint will be on the last Saturday in July and the CW Sprint will be on the first Saturday in August. The Sprints are of one-hour duration on 80m, and are open to all licensed amateurs in ZL, VK and Oceania call areas.

Object of the Sprints: The operator's basic goal in the sprints is to make as many contacts as possible, without duplication, during an hour of operation on a single band. Any contact with ZL, VK or Oceania stations on 80m during the contest period can be counted, but a station may be claimed only once.

Eligibility: The Waitakere Sprints are open to all licensed amateurs anywhere in the ZL, VK and Oceania call areas. SWL logs will also be welcome. 2008 Contest Periods

Phone 1000 to 1100 UTC, on Saturday 26th July

CW 1000 to 1100 UTC, on Saturday 2nd August

Frequencies

Phone: 3.550 to 3.700 may be used.

CW: 3.500 to 3.550 may be used.

Power: In fairness and consideration to others NO LINEAR AMPLIFIERS are to be used during the contest.

Contest call: CQ Contest, CQ Sprint or CQ Test.

Awards: Certificates will be awarded to the overall winner and to the best score in each ZL call area and to the best three scores from VK/ Oceania.

Special Award: To encourage contestants to enter both Sprints we have decided to issue a Special Certificate to the entrant with the Highest combined score. The method of calculation will be: (Phone points + CW Points) x 2. All logs received will be considered for this award. To qualify for the multiplied points each log must contain a minimum number of valid contacts. ie. Ten (10) for Phone and Five (5) for CW.

Logs: A separate log must be submitted for each Sprint and must be clearly marked PHONE or CW. Contest logs must show for each

contact:- Date, Time, Callsign of station worked, Signal report and serial number sent, Signal Report and serial number received. SWL logs must show both Callsigns in the QSO also both Signal Reports and serial numbers. Logs are to be in the hands of the Manager, Waitakere Sprint by 1 September.

Sample Log

| Date | Time | Station Worked | Report and Serial Sent | Report and Serial Received | Points |
|------|------|----------------|------------------------|----------------------------|--------|
| | | | | | |
| | | | | | |
| | | | | | |

Postal address: Manager Waitakere Sprint, PO Box 72 397, PAKAKURA 2244

Email is the preferred method of log receipt. A Plain text file named (yourcallPh.txt or yourcallCW.txt) with a tab or space between each column. Email to prc@ihug.co.nz An email confirming receipt of logs will be sent as logs are received.

Closing Date For Logs: No later than 1st September.

Operator Information: Each log must show the following details: Mode, Callsign, Name, Address, Operating area (Eg. ZL1,ZL2,VK, Oceania), Total Number of contacts claimed

A declaration that the operator has abided by the rules and spirit of the contest. Any entry which is clearly in violation of the rules or spirit of this contest or which contains an excessive number of duplicate contacts (this does not refer to duplicates which have been indicated as such and are not claimed) may be disqualified. The decision of the Waitakere Sprint Manager in respect of interpretation of these rules, the granting of awards and disqualifications will be final and no correspondence will be entered into.

NZART STRAIGHT KEY NIGHT

Polish and lubricate that old morse key and enjoy an evening of old time radio fun. An activity night in which everyone can be a winner with a certificate to prove it.

When: First Sunday in November 2000–2300 NZST.

Band: 80 m (3.5 MHz) only.

Mode: CW sent with straight key i.e. characters formed manually, no system of automatic dots, dashes or spacing permitted.

Divisions: Vintage QRP, Vintage QRO, Open QRP, Open QRO.

Explanation: Vintage: Receiver and transmitter or transceiver using valves, no solid state devices in the signal line permitted. QRP: 5 watts or less RF output.

Exchange: RST/QTH/operator's name (one word)/key used (e.g. ZC1, P&T)/TX type (eg ZC1, FT1000, homebrew)/TX power (watts). Except for DX stations (i.e. non ZL mainland) only rst, operators name, and QTH need be exchanged.

Scoring: 1 Point per QSO. Stations may be worked once, CW to CW only. All stations submitting logs must use a straight key throughout, but straight key stations may QSO stations using bugs, electronic keys or keyboards.

Multipliers: Multiply total points as follows: Vintage QRP x2, Open QRP x1.5, Vintage QRO x1.2, Open x1.

Logs: Each log QSO entry to show: Time (NZST or Z), callsign, RST, QTH, name, key type, Tx type, Tx power (of station worked). Calculate total score, multiply to give total score claimed. Logs to have associated data sheet giving entrant's: name, call-sign, QTH, age (optional), full description of equipment used, ie. key, Tx/Rx, Tx power, antenna.

Send logs by email, mail, fax, on or before November 20 to: Ken McCormack ZL1AIH, 181 Ararimu Valley Road, Waimauku, Auckland or E-mail address <zllaih@xtra.co.nz>.

Certificates will be sent to the top three stations in each Division (including DX entrants who send in logs). All other entrants will receive a personalised certificate if an A4 self-addressed envelope is sent to the Straight Key Night manager. Any photos of operators and/ or equipment gratefully received. There are five contests which are spaced over the period of a year. The contests are during Saturdays and Sundays, with 1 hour contest periods occurring from 1600 to 2200 on the Saturday and 0800 to 1400 on the Sunday.

NOSTALGIA NIGHT CONTEST

Haul out that old equipment, dust off the cobwebs, check it over and join in a night of nostalgia and fun. This year's contest will be in three sections, catering for the varied interests within the old equipment ranks.

1. QRP

2. Military

3. Open

The overall winner shall be the entrant having the highest points score which will be published in the following Break-in.

WHEN:

Second Saturday each September

Four operating periods – each half an hour

Local ZL time:

1930-2000 hrs

2000-2030 hrs

2030-2100 hrs

2100-2130 hrs

EQUIPMENT:

Any rig of the past that uses thermionic valves, be it home made, of military origin, commercial or amateur, no solid state or ssb type equipment is acceptable for this event.

CYPHER

Rs(t) Plus branch number.

POINTS:

Three points for AM phone to AM phone QSO. Six points for CW to CW QSO. Only AM and CW contacts are valid for this competition.

MULTIPLIER:

Each NZART branch worked (e.g. Ten branches worked overall and thirty contacts: $10 \times 30 = 300$, not 10 branches each period)

ZL1 to ZL3 or ZL4 or reverse multiply by 1.2

ZL2 to ZL4 or reverse multiply by 1.2

TOTAL POINTS

QSO points multiplied by number of branches.

BUT

1. QRP section-if your rig is 5w or less input, then multiply your score by 1.5

2. If your rig is of military origin i.e. ZC1, ARC5, 19 SET, then multiply your score by 1.2

3. Open section – if your rig is other than 1 or 2 but within the power limit no multiplier (the power limit is the legal power limit). BUT Only one multiplier may be chosen (e.g. military OR QRP – not both).

Repeat QSOs:

These are permitted each operating period on phone and cw, but no consecutive contacts with the same station.

LOGS:

Send to: Nostalgia Contest, Mike Digby-Smith ZL1MDS, 6 Baird Ave, Te Kauwhata within seven days with the following data

1. Number of QSOs on CW.

2. Number of QSOs on AM phone

3. Number of different branches worked

4. Score claimed (points x branches).

5. Overall score claimed (points in 4 multiplied by section 1 or 2 as applicable)

6. Details of equipment used for the event.

7. Any comments about event or suggestions

8. Do not send a copy of your log or contacts just the above information.

9. Have a lot of fun on the night.

Mike Digby-Smith ZL1MDS miked@south.net.nz &Barrie Vivian ZL2LA

BOAT ANCHOR SPRINT RULES

This is in two sections:

Section 1: Old radios – all valves – i.e. ZC1, 19 set, Heathkits, any home brew set, but must have all valves.

Section 2: Any Hybrid transceiver (must have valve finals i.e. FT200, FTDX400/401, Drake, FT 101s, etc.

Amplitude Modulated signals only.

The overall winner shall be the entrant having the highest points score which will be published in the following Break-in.

WHEN:

The second Saturday each February, April, June, August, October.

One operating period Local ZL time: 2000 to 2100 hrs

CYPHER:

RS

POINTS:

One point for phone to phone QSO. No repeat QSO's:

Stations may be worked a maximum of once on AM phone.

There will be no multipliers.

LOGS:

Send to: Boat Anchor Sprint, Mike Digby-Smith ZL1MDS, 6 Baird Ave, Te Kauwhata within seven days with the following data

1. Number of QSO's

2. Overall score claimed

3. Details of equipment used for the event.

4. Any comments about event or suggestions

5. Do not send a copy of your log or contacts just the above information.

6. Have a lot of fun on the night.

NZART DOUG GORMAN MEMORIAL FREQUENCY MEASURING CONTEST

When?

First Monday in September at 2115 NZST (0915 UTC)

This year the contest will blend the old school rules with some improvements suggested by contestants, in particular Papakura Branch and Murray ZL1BPU, along with observations made by past contest organizers Gavin ZL2ACT and Neil ZL2TNG. Please read the rules carefully as there are some key changes to the format.

1 Listen to ZL6A on 3895 kHz LSB for instructions on the frequencies that will be used and the procedure to be adopted. Following the voice instruction an unmodulated carrier will be radiated on 3895 kHz for calibration and/or practice.

The contest itself will start at 2115 on the first frequency for five minutes, and every five minutes on a new frequency, for a total of five frequencies. All transmissions will be made within ± 5 kHz of 3895 kHz. Individual transmission start times may be delayed slightly due to equipment setup and adjustment.

Each transmission will be identified in 10 wpm Morse (CW) for about three minutes to allow the frequency to be located and will

then remain key-down for the remaining minutes. At the end of the five minute period the transmission will cease. For station competing in the Ultra Category (see below) only the last 10 seconds of carrier should be measured.

2 Read each frequency as accurately as possible. To qualify for an award it is essential to read at least three frequencies.

3 Post your entry to: Doug Gorman Frequency Measuring Contest, NZART, P0 Box 40-525, Upper Hutt.

4 Entries should be sent within seven days, together with details of equipment used and which section entered (John McKim Cup, Norm Edwards Shield, or Ultra Category).

5 **Results:** Participants may nominate which of the five frequencies they measured should be considered in their average score, with a minimum of three. The degree of accuracy will be judged by subtracting measurements from the actual transmit frequencies and averaging the nominated results.

6 **Awards:**

John McKim Cup for those using simple direct reading type

of equipment. This includes a receiver using a calibrated dial or digital readout of kilohertz to one decimal place (100 Hz), or a simple commercial or homemade heterodyne type frequency meter (BC221, LM-10, etc).

Norm Edwards Shield for those using more sophisticated equipment. This includes receivers with digital readout of kilohertz to two or more decimal places (10 Hz or better) and computer methods, oscilloscopes, generators, etc, typically referenced to a local frequency standard (TCXO or ovened oscillator).

Ultra Category for measurements directly referenced during the contest to an atomic standard or GPS disciplined oscillator. This does

not include off air calibration to WWV, etc, during the contest.

Branch Award certificate to the branch with the lowest average of the three best competitors. If you wish to support your branch, state you branch number and name on your entry form.

Certificates will be provided to all entries with an average deviation of 100 Hz or better.

If you make readings during this activity, but do not wish to have your results published, or if you wish to comment please drop the contest organizers a line so we know how many people were interested.

73,

de John ZL4JY

Doug Gorman Memorial Frequency Measuring Contest Entry Form

| | | | | | | | | |
|---|-----|----|--|----|-----|---|-----|-----|
| Name | | | Call-sign | | | Branch | | |
| Details of all equipment used: | | | | | | | | |
| Make | | | Model | | | | | |
| Comments | | | | | | | | |
| Section entered (please tick): | | | | | | | | |
| <input type="checkbox"/> John McKim Cup | | | <input type="checkbox"/> Norm Edwards Shield | | | <input type="checkbox"/> Ultra Category | | |
| | | | | | | <input type="checkbox"/> Branch Award | | |
| Measured Frequencies: | | | | | | | | |
| 1. | kHz | 2. | kHz | 3. | kHz | 4. | kHz | 5. |
| | | | | | | | | kHz |

Post entry to: Frequency Measuring Contest, NZART, PO Box 40-525, Upper Hutt

VHF-UHF-SHF CONTEST RULES

These are the rules for VHF-UHF-SHF Contests, as administered by the Wellington VHF Group. A PDF edition (130K) is also available at <http://www.vhf.org.nz/pubs/Contests/VHF-UHF-SHF-ContestRules-February2010.pdf>.

Rules effective from February 2010.

CLAUSE 1. Contest dates

DX Weekend Contest

All bands 50 MHz and up. First Saturday in February, and the following day.

Low Band Contest

All bands 50 MHz to 440 MHz. First Saturday in April, and the following day. Delayed one week if it clashes with VHF Convention, or Easter.

Hibernation Contest

All bands 50 MHz and up. First Saturday in June, and the following day. Delayed one week if it clashes with NZART Conference.

Brass Monkey Contest

All bands 50 MHz and up. First Saturday in August, and the following day.

Microwave Contest

All bands 614 MHz and up. First Saturday in October, and the following day.

Field Day Contest

All bands 50 MHz and up. First Saturday in December, and the following day.

For all contests, the operating periods are 1700 to 2300 on the Saturday, and 0700 to 1300 on the Sunday, NZ local time.

CLAUSE 2. Definitions

QRP shall mean a transmitter operating at an output power of 5W or less.

A Field Station is one where all equipment, including power sources, antenna systems and operating shelters are taken to the site, and no other facilities are used.

Light. Electronic signal generation, modulation and detection, shall be used on all bands, including between 400 THz and 750 THz (light).

CLAUSE 3. Crossband or repeater contacts

Crossband contacts, or contacts through repeaters, are invalid in these contests.

CLAUSE 4. Time

All contest periods begin and end on the hour. Use time signals from a reliable source.

CLAUSE 5. Operation site

Stations may use only one site for the duration of the Contest, but may move to shelter within one kilometre. Any greater move requires a scoring restart. Two, or more, stations in close proximity may only participate if the stations are erected and operated entirely independently throughout the Contest.

CLAUSE 6. Teams

Team operation is advisable on field sites, for safety. No member of a team that has set up and operated a station may earn points for that station by making contact with that station.

CLAUSE 7. Call-signs

Only one call-sign may be used by a station for the duration of the Contest.

CLAUSE 8. Repeat contacts

No station may be worked twice in a period on the same band, nor may consecutive contacts be made on that band to the same station, bridging a period change, unless the other station has worked a third station, if available, in the interim. There shall be a period of, at least, 5 minutes between contacts, if a third station is not available.

CLAUSE 9. Contact Serial Numbers

Contacts must be fully two-way. Serial numbers must be correctly exchanged and acknowledged, before points may be claimed. The serial number is made up of RS(T) plus a three digit number.

CLAUSE 10. Station location

Location details of contesting stations must be exchanged on first contact with each new station, especially if mobile, and entered into

the log. Stations shall give their location as latitude and longitude, using the NZ1949 Geoid, to within five minutes resolution or full Maidenhead Locator. As the full Maidenhead is only accurate to 7 km, station location shall be given to within 30 seconds resolution, approximately 0.9 km for contacts above 2.4 GHz. "Christchurch" or "Home station" is an insufficient description. The station giving the insufficient description will be penalised.

CLAUSE 11. Logs

Contest logs must reach the VHF/UHF/SHF Contest Manager, Wellington VHF Group, PO Box 12-259, Thorndon, Wellington, within two weeks of the contest, and must contain:

- A certificate signed by the chief operator, stating that the station was operated in accordance with the Radio Regulations and these contest rules.
- A list of all operators and call-signs.
- The station call-sign and operating site, accurately described. Please include an email address for correspondence and a postal address for certificates.
- Power of each transmitter used.
- Optional supplementary information on conditions and/or equipment used, for publication. This is of value to other contestants, and to the contest organisers.
- Separate log sheets for each contest section, in each band, single-sided, showing the following:
 - Heading, showing Section, Band, Contest, Date.
 - Time and (other) station call-sign, for each contact.
 - Serial numbers exchanged.
 - Other station location (first contact).
 - Distance in kilometres to other station.
 - Claimed score for each contact.
 - Running score per sheet, total for band, with any bonus points. Each section, on each band, is a mini-contest, please log them that way.
- An email address for results, if you don't want to wait until the results are published in Break-In, HQ InfoLine, Q-Bit and Spectrum.
- Check logs are welcome.

CLAUSE 12. Scoring

You must score your own log, as detailed below.

For ease of scoring, the use of a map with a scale of one to one million, such as InfoMap 265, or similar, is suggested. At this scale 1 mm = 1 km.

Table 1 – Basic scores

- 48 cm 0.3 points per kilometre
- 32 cm 0.3 points per kilometre
- 23 cm 0.2 points per kilometre
- 13 cm 0.5 points per kilometre
- Above 3 GHz, one point per kilometre
- Round the points per contact to the nearest integer:
- Less than 0.5 rounds down; 0.5 and above rounds up.

CLAUSE 13. Bonus Multipliers (in order of application)

There are no multipliers for "manual" modes such as: CW, AM, SSB, FM and digital voice, etc.

Multiply the basic score by 1.5 for "machine" modes such as: RTTY, ASCII, AMTOR, Packet, SSTV, ATV, etc.

QRP. Multiply previous score by 1.5. Stations may use QRP on some modes, and/or bands, and high powers on others, with multipliers calculated on a contact by contact basis. The establishing of a contact on high power, then reducing the power for scoring purposes, is not permitted.

Field Station, as defined in Section 2 of these Rules—multiply previous score by 1.2.

CLAUSE 14. Discussion

The ruling of the Contest Committee is final, and no discussion will be entered into.

June 2006 Edition Updated to February 2010; Change notes the Low Band contest may be deferred by 1 week if it clashes with Easter, as well as with the VHF Convention. This is as promulgated in the NZART Infoline on Sunday, 7 February 2010.

INTERNATIONAL HF CONTEST CALENDAR

| Weekend | UTC | Mode | Contest | Sponsor |
|-----------------|-------------------|--------|---------------------------|----------------------|
| January | | | | |
| first | 1800 Sat–2400 Sun | RTTY | ARRL RTTY Round-up | ARRL (USA) |
| second | | | | |
| third | 1200 Sat–1200 Sun | CW/SSB | HA DX | MRASZ (Hungary) |
| fourth/last | 1200 Sat–1200 Sun | RTTY | BARTG Sprint | BARTG (UK) |
| | 0000 Sat–2400 Sun | CW | CQ WW 160m | CQ Magazine (USA) |
| | 0600 Sat–1800 Sun | CW | REF CW | REF (France) |
| | 1300 Sat–1300 Sun | SSB | UBA SSB | UBA (Belgium) |
| February | | | | |
| first | | | | |
| 2nd | 0000 Sat–2400 Sun | RTTY | CQ WPX RTTY | CQ Magazine (USA) |
| | 1200 Sat–1200 Sun | CW/SSB | PACC | VERNON (Netherlands) |
| 3rd | 0000 Sat–2400 Sun | CW | ARRL International DX CW | ARRL |
| 4th | 0000 Sat–2400 Sun | SSB | CQ WW 160m | CQ Magazine (USA) |
| | 0600 Sat–1800 Sun | SSB | REF SSB | REF (France) |
| | 1300 Sat–1300 Sun | CW | UBA CW | UBA (Belgium) |
| March | | | | |
| 1st | 0000 Sat–2400 Sun | SSB | ARRL International DX SSB | ARRL |
| 2nd | 1000 Sat–1000 Sun | CW | BERU | RSGB (UK) |
| 3rd | 1200 Sat–1200 Sun | CW/SSB | RDXC | |
| | 0200 Sat–0200 Mon | RTTY | BARTG Spring | |
| 4th/last | 0000 Sat–2400 Sun | SSB | CQ WPX SSB | CQ Magazine (USA) |

| | | | | |
|------------------|---|---------|--------------------------|---------------------|
| April | | | | |
| 1st | 1600 Sat–1600 Sun | RTTY | EA RTTY | URE (Spain) |
| | 1500 Sat–1500 Sun | CW/SSB | SP DX | PZK (Poland) |
| 2nd | 0700 Sat–1300 Sun | CW | JIDX CW | |
| 3rd | | | | |
| 4th | 1200 Sat–1200 Sun | RTTY | SP RTTY | PZK (Poland) |
| May | | | | |
| 1st | 2000 Sat–2000 Sun | CW/RTTY | ARI International | ARI (Italy) |
| 2nd | 1200 Sat–1200 Sun | RTTY | VOLTA | |
| 3rd | | | | |
| 4th/last | 0000 Sat–2400 Sun | CW | CQ WPX CW | CQ Magazine (USA) |
| June | | | | |
| 1st | | | | |
| 2nd | | | | |
| 3rd | 0000 Sat–2400 Sun | CW | All Asian DX CW | JARL (Japan) |
| 4th | | | | |
| July | | | | |
| 1st | 1100 Sat–1100 Sun | RTTY | DL DX RTTY | |
| 2nd | 1200 Sat–1200 Sun | CW/SSB | IARU WW | ARRL (USA) |
| 3rd | | | | |
| 4th | 1200 Sat–1200 Sun | CW/SSB | IOTA | RSGB(UK) |
| August | | | | |
| 1st | | | | |
| 2nd | 0000 Sat–2400 Sun | CW | WAE CW | |
| 3rd | 0000–0800 Sat 1600–2400 Sat 0800–1600 Sun | RTTY | SARTG | SARTG (Scandinavia) |
| 4th | 1200 Sat–1200 Sun | RTTY | SCC | |
| September | | | | |
| 1st | 0000 Sat–2400 Sun | SSB | All Asian DX SSB | JARL (Japan) |
| 2nd | | | | |
| 3rd | 1200 Sat–1200 Sun | CW | SAC CW | |
| 4th/last | 0000 Sat–2400 Sun | RTTY | CQ WW RTTY | CQ Magazine (USA) |
| | 1200 Sat–1200 Sun | SSB | SAC SSB | |
| October | | | | |
| 1st | 0800 Sat–0800 Sun | SSB | Oceania SSB | NZART/WIA |
| 2nd | 0800 Sat–0800 Sun | CW | Oceania CW | NZART/WIA |
| | 0700 Sat–1300 Sun | SSB | JIDX SSB | |
| 3rd | 1500 Sat–1500 Sun | CW | Worked all Germany (WAG) | DARC (Germany) |
| | 0000 Sat–2400 Sun | RTTY | JARTS | |
| 4th/last | 0000 Sat–2400 Sun | SSB | CQ WW SSB | CQ Magazine (USA) |
| November | | | | |
| 1st | 1200 Sat–1200 Sun | CW/SSB | Ukrainian | |
| 2nd | 0000 Sat–2400 Sun | RTTY | WAE RTTY | DARC (Germany) |
| | 0000–2400 Sun | CW | OK/OM | |
| 3rd | 1200 Sat–1200 Sun | CW/SSB | LZ | |
| 4th/last | 0000 Sat–2400 Sun | CW | CQ WW CW | CQ Magazine (USA) |
| December | | | | |
| 1st | | | | |
| 2nd | 0000 Sat–2400 Sun | CW/SSB | ARRL 10m | ARRL (USA) |
| 3rd | 0000–2400 Sat | RTTY | OK RTTY | |
| | 1400 Sat - 1400 Sun | CW | 9A Croatian | |
| 4th | 0200 - 1000 Sun | CW | RAEM | |

NZART AWARDS

Award Notes

When applying for an award, whether through NZART or through and overseas Society, courtesy demands that you observe the following:

- 1) PRINT your name, address and call-sign;
- 2) Clearly state what award (and endorsements) you are applying for;
- 3) Supply checking sheet with call-signs, dates of QSOs, mode, etc;
- 4) Enclose required funds (currency/IRC/stamps) as requested.

For NZART Awards

- 1) The usually accepted rules apply to all NZART awards.
- 2) NZART stresses the HONOUR SYSTEM. Award applicants need NOT hold QSL cards for claimed contacts. It is sufficient to merely certify that the QSO was legitimately made. This no QSL rule applies ONLY to NZART sponsored awards.
- 3) Endorsements for mode/time/location etc made at applicant's request.
- 4) New Zealand, US or Australian currency accepted instead of IRC but cheques NOT desirable.

New Zealand stamps OK \$1, \$2 or \$3 preferred.

- 5) Post applications to NZART Awards Manager, PO Box 1733, Christchurch Mail Centre, Christchurch 8140, New Zealand.

Application Forms

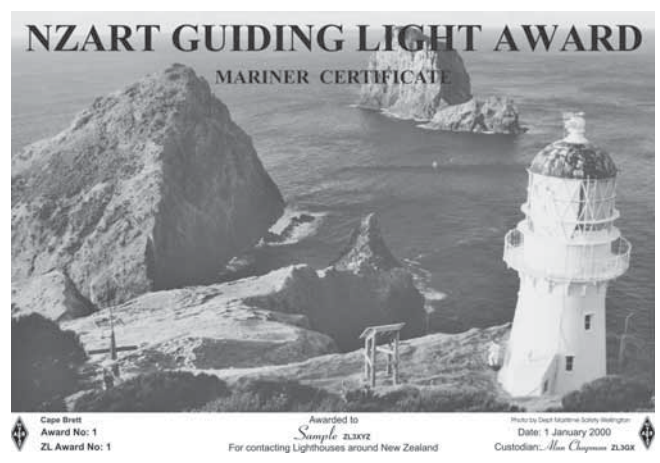
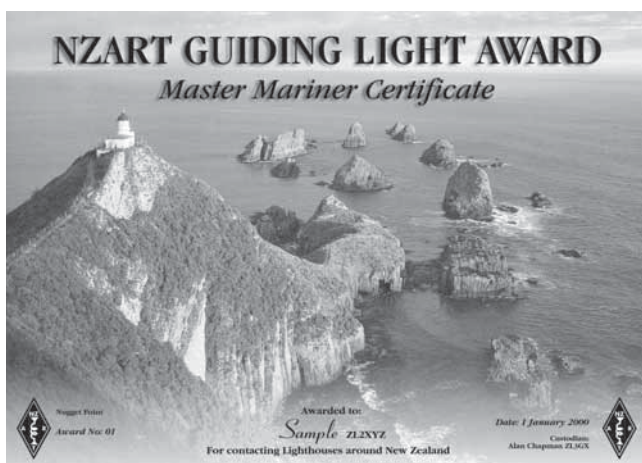
Application Forms suitable for most awards are available from NZART Awards Manager (SASE please) or on the web at www.nzart.org.nz/awards/index.html

Cost of Awards

NB—Cost given for awards are those for ZL applicants. Overseas applicants pay \$US5.00 for each NZART award or one IRC per \$1.00.

For Branch Awards

- Logs need not be verified unless stated.
- All awards are open to shortwave listeners unless stated.
- The honour system also applies to Branch Awards.



NZART BRANCH AWARDS

Aotearoa Postcode Award

This award has been presented to stimulate awareness and the use of postcodes in the New Zealand postal system — at least by the amateur fraternity.

To some extent it is a sister award to the Australian Amateur Radio Postcode Club.

1. The award is open to all Amateurs and SWLs.
2. All contacts made on or after 20 October, 1991, will be eligible for the award.
3. A certificate will be issued for basic qualification, and stickers for the various following upgrades.
4. Portable and mobile stations must give the postcode for the particular area they are in and can claim that postcode for the award.
5. Basic Award: Make contact with ZL stations and obtain their QTH and Postcode. Then use the suffix letters of the station claimed to complete the following phrase — AOTEAROA LAND OF THE LONG WHITE CLOUD. Each letter of a call-sign may only be used once unless that station is contacted in a different postcode area. Claim each postcode once only.
6. Upgrades: Stickers will be issued as follows: Postie — 100 different postcodes; Mail Officer — 150 different postcodes; Supervisor — 200 different postcodes; Branch Manager — 250 different postcodes. (There is provision for an extension for the enthusiast.)
7. All amateur modes and bands may be used. Repeater contacts accepted.
8. Cost: Basic certificate — ZL stations \$3.00
VK stations US\$2.00
DX stations US\$3.00
Upgrades — ZL stations SASE plus \$1.00 for first — SASE for other three. VK Stations SASE plus \$1.00 stamp for each upgrade. DX stations SAE plus US\$1.00 for each upgrade.
9. On application send a log with the following: date of contact, station contacted, postcode number, and area to Awards Manager, 48 Leslie Street, Waitara 4320.

As NZ Post revamped the system in July 2006, all old numbers will be accepted for contacts made up to 31 August 2006. From 1 July 2006, the new numbers are acceptable.

Bay of Plenty Award — Series 2

Sponsored by the Tauranga

Branch 39 of NZART for working stations in the Bay of Plenty region — ie, Opotiki, Rotorua, Tauranga and Whakatane Counties and all cities and districts within this region.

ZLs need either 10 stations on any band or five stations on 50 MHz or higher.

The rest of the world need five stations on any band.

All stations to be in different Maidenhead Locator sub-squares, since January 2006.

This award is available to Listeners on a "heard" basis. Applications with \$4.00 (overseas US\$5.00) with check-list showing station, date and time, worked mode and band (QSLs not required) to Secretary Tauranga NZART, C/- Emergency Management Office, WBOP District Council, Private Bag 12 803, Tauranga Mail Centre, Tauranga 3143.

Christchurch Award Requirements

Christchurch amateurs (those within the normal coverage of the 705 repeater) 25 different stations; rest of ZL — 15 stations; VK — 10 stations; rest of world — five stations. Definition of a Christchurch station that may be worked for this award is any station that is operating from within the metropolitan area of Christchurch. Cost: ZL and VK NZ\$5.00; others US\$4.00 or equivalent. Applications to Christchurch Amateur Radio Club Awards Manager, PO Box 1733, Christchurch Mail Centre, Christchurch 8140.

Christchurch Amateur Radio Club Branch 05 Brasspounders' Club Award

The aim of this award is to promote Morse technique in a friendly competitive way and to encourage conversational CW between fellow amateur radio enthusiasts.

A Certificate of Accomplishment will be issued by the Christchurch Branch Awards Manager when suitable evidence shows that the applicant has gained the appropriate points total.

For the "INITIAL AWARD" (25 points minimum) the following QSO types are acceptable.

1. CW QSO with Christchurch Amateur Radio Club Branch 05 Club member — one point.
2. CW QSO with Christchurch Amateur Radio Club Branch 05 "Brasspounders" Club member — two points
3. CW QSO with Christchurch Amateur Radio Club Branch 05

"Brasspounders" Club member via ZL3AC Club Station—four points

Bonus points may be added to each of the above according to the following criteria:

4. If the QSO was conducted throughout using a STRAIGHT key, claim two bonus points.
 5. If the QSO was conducted throughout using an a ELECTRONIC keyer or SEMIAUTOMATIC key (bug type) claim one bonus point.
- A QSO conducted with COMPUTER Morse will not be eligible for a bonus.
- Type "3" QSOs if multiple, must be spaced at least 24 hours.

Award Par Excellente 60 points minimum

For "AWARD PAR EXCELLENTE", New Zealand "Home Stations" must include at least two type "1" QSOs, and there is no points limit on type "5" contacts. Where the same station is being claimed more than once, there must be at least 24 hours separation between the QSOs.

Overseas stations need only one type "1" QSO for their "Award Par Excellente" included with their claim, and may claim two points for each "ZL" QSO together with one extra bonus point if the "ZL" is a "Branch 05 member". At least 24 hours must separate QSOs where the same station is being claimed more than once.

Rules

Frequencies: All Amateur Band CW frequencies may be used.

Who: All Radio Amateurs.

Claims: Log extracts showing date, time on/time off, signal reports, other operator's call and QTH.

Check: Log extracts shall be countersigned by one other similarly licenced amateur operator.

Duration: Contacts claimed shall have been of at least one quarter hour (15 minute) duration.

Signals: No claims will be accepted with reports of T7 or lower.

When: Only QSOs commenced after the inauguration are acceptable. Inauguration date is 1 February, 1993. There is no closing date for claims unless the award termination is promulgated.

Points: Points claimed for "INITIAL AWARD" may not be used for the "AWARD PAR EXCELLENTE".

Costs: NZ\$12.00 Initial Award. The Club Station ZL3AC will be on the air from 0800 UTC on an occasional basis. The operating frequencies are from 3.5 MHz to

3.575 MHz and on other HF bands depending on conditions.

Address all claims to Christchurch Amateur Radio Club Awards Manager, PO Box 1733, Christchurch Mail Centre, Christchurch 8140, New Zealand.

City of Dunedin Award

Otago Branch 30 promotes this award which features colour photographs of Albatrosses in the colony on the Otago Peninsula, the lighthouse at Tairua Heads, and a view of Dunedin City from Stuart Street.

Contacts since 1 July, 1986 eligible and the required 10 points for ZL applications (five point DX) may be accumulated from the following allocations:

| | |
|----------------------|-------|
| ZL4AA Branch station | 3 pts |
| Branch 30 President | 2 pts |
| Branch Life Member | 2 pts |
| Branch YL | 2 pts |
| Other Branch members | 1 pt |

Award is open to SWLs.

NO repeater contacts and each station can be worked ONCE only. Any one band/mode or a combination of any bands/modes may be used. Cost — NZ\$2.50 with application to Awards Manager, PO Box 5485, Moray Place, Dunedin 9058.

Fiordland National Park Award

Requirements: Contact four separate stations/operators in or within one kilometre of the Fiordland National Park, plus two contacts with Branch 08 members. Total — six contacts. Send log (no certifying required) with \$5.00 (stamps OK) to George McKenzie ZL4JP, Waiparu, No. 7 RD, Gore 9777.

Gisborne Award

Requirements: Contacts after 1 January 1969, as follows: Gisborne amateurs — five different stations. ZL — four stations. Rest of world — two stations.

Cost: ZL/VK/US\$5.00. Apply to Ric Coleman, 12 Grundy Street, Mangapapa, Gisborne 4010.

FISTS Down Under Award

The FISTS Down Under Award is earned by accumulating 50 points. For this award contacts with any FISTS Down Under (FDU) member in ZL or VK since the inauguration of FISTS Down Under on 1 June 1988 are worth one point. Contacts with FDU affiliated club stations are worth five points each. (Currently ZL6FF, VK2FDU, ZL2SWR and VK4RC/VK4IZ.) This award is available

for all FISTS Club members worldwide. A station can only be claimed once. – Note, the one point for working a FDU station is the same for all members, (i.e. there is no premium for working outside one's country.)

Please note the special e-mail address for applications for this award, zl2aoh@ihug.co.nz or by post to Ralph Sutton ZL2AOH at call book address. Internet: <http://fistsdownunder.org>

Kapiti Branch Award

1. Ten points required on any band — including VHF-UHF and repeater contacts. Different stations are required.
2. One point for any NZART member residing permanently in the district.
3. Two points for any branch member.
4. Three points for any committee member.
5. Four points for ZL2KB.
6. Net contacts are permitted, except the Branch net.
7. A listeners' award is available. Recording of sufficient two-way contacts worth 10 points.
8. Packet contacts attract two points each for Kapiti Branch member worked direct.
9. Double points for CW contacts, excluding Field Days.
10. No two contacts with the same station are permitted.
11. Price \$5.00 per certificate.
12. Enquiries to Award Manager, Kapiti Amateur Radio Club, C/- P O Box 81, Paraparaumu 5254.

Kawerau Woodskills Festival Award

This is to run the first two weeks in September each year. Contacts with Kawerau Branch 67 stations on any band, ie, HF, VHF, UHF.

Rules

Ten points required for ZL applicants (five points for DX stations) may be accumulated as follows:

1. ZL1KW worth five points, Branch President worth three points, Vice President worth three points, any other Branch member one point.
2. Award is available to all Amateur operators or SWLs who accumulate 10 points.
3. The Award application containing a copy of log details or SWLs, name and address plus \$5.00 fee to be received by The Awards Manager no later than November 1 each year.

Applications for this Award to the Awards Manager, Branch 67 NZART, C/- Bev Osborne ZL1OS, 34 Cobham Drive, Kawerau 3127, New Zealand.

Manawatu Award

For overseas stations working FIVE stations who are members of Manawatu Branch 20. Certified list and US\$3.00 or five IRCs to ZL2AFT, 429 Albert Street, Palmerston North 4410.

Manawatu Amateur Radio Society Windmill Award

The Manawatu Amateur Radio Society Windmill Award is open to all Amateurs and SWLs. To obtain the award stations require seven contacts with Branch 20 members of which one must be a compulsory contact with the Branch Station ZL2KO.

Stations may only be contacted once and must be financial members of Branch 20 at time of contact. All contacts to be made after 1 September 2000.

Overseas stations only need to contact five branch members and the club station is not a compulsory contact for them but optional.

The award is open to all amateurs and SWLs. The cost of the award is NZ\$6.00. Overseas US\$5.00 for overseas stations. Please note that this is a separate award to the branch DX award although it is open to DXers.

Applications should be made to: Award Custodian, Manawatu Amateur Radio Society, PO Box 1718, Palmerston North Central, Palmerston North 4440.

Papakura Radio Club "21" Award

For contacts with ZL1VK (5 points) and 8 members (2 points each of the Papakura Radio Club, total of 21 points. These revised rules apply to contacts made after 1 January 2011. Certified list and \$5.00 to Secretary, Papakura Radio Club, PO Box 72-397, Papakura, Manukau 2244.

Reefton-Buller Award

Basic Award requires contact with any five Branch 62 members.

Merit Award requires, in addition to Basic, that ZLs contact one Branch 62 XYL or YL and the Club station ZL3BRC. Overseas stations contact any one of those mentioned above. Two categories HF and VHF.

NO QSLs required. Send certified list with \$5.00 to NZART Awards' Manager. List of members etc available from Branch 62 Secretary.

The Rhododendron Festival Award

The award is to be held by the combined clubs of Taranaki branches on or about November each year to coincide with "The Rhododendron Festival". The

award certificate will be one of a series of coloured, hand-painted prints of named Rhododendron varieties by the well-known Taranaki artist, Janet Marshall. Other designs are provided if requested.

Rules

1. The Award will run for two weeks about the beginning of November each year. It is available to all Amateurs and Shortwave Listeners.
2. Contacts may be made on any band, any mode. Each station may be worked once only for each separate application for the Award.
3. New Zealand stations require 25 points from those listed below:
Compulsory contact with Special Event Station ZL6RFA — five points
Contact with Taranaki Branch stations — three points.
New Plymouth Branch 27 — ZL2AB.
Hawera Branch 14 — ZL2HAW.
Inglewood Branch — ZL2PT.
Rahotu Coastal Branch 32 — ZL2ANN.
Waitara Branch 47 — ZL2TO.
South Taranaki Branch 87 — ZL2QF.
Each additional Taranaki station (ie, a station whose usual base station is in Taranaki) — one point
4. Overseas stations require only six points, calculated as above, and do not have to make a compulsory contact.
5. Copy of log, with a note of your Award choice and fee, to arrive before 10 December to: The Award Custodian, NZART Branch 27, C/- 45 Robe Street, New Plymouth 4310, New Zealand
6. Fees, including return postage:
For ZL award applications \$5.00 each.
For all overseas award applications, US\$5.00 or fair equivalent.
Main operating frequencies Rhodo Net—3.660 ± MHz, NZ Awards Net—3.677 MHz, and any amateur frequencies.

Rag Chewers Award

The award is for a non-stop half hour QSO with any station, on any band, or any mode. This award was first introduced into New Zealand in 1931 by Alex Rennie ZL2AR.

The certificate is the artist's impression of a "Rag Chewer" and sketched by the well-known cartoonist Jim Hubbard and is professionally printed on gloss paper.

A fee of \$5.00 is applicable.

Application for the award can be

made to: Ivan Horn ZL2ATU, P.O. Box 7250, Wanganui 4501.

Southern Polar Plunge Award

This Award sponsored by the Otago Branch NZART Inc, coincides with the longest nights/shortest days of the year and is to highlight the mid-winter activities in the southern parts of New Zealand.

1. The Award will run in the week of 21 June and contacts with Otago Branch operators on any band or mode are eligible but each station may be worked once only.
2. Ten points required for ZL applications (five points for DX stations) may be accumulated from the following allocations:
ZL4AA — Otago Branch Station, three points.
Branch President, two points.
Any other Otago Branch member, one point.
3. Award is available to any amateur operators for SWLs who accumulate the necessary points.
4. The Award application containing a copy of log details and operator's or SWL's name and address plus \$5.00 fee to be received by — The Awards Manager, Otago Branch NZART Inc, PO Box 5485, Moray Place, Dunedin 9058.

No later than July 31 each year.

The Tane Mahuta Award

By Branch 28 with VHF and HF

Rules

1. The HF Tane Mahuta Award for 20 contacts including at least one in the each of the Counties of Rodney, Otamatea, Hobson, Hokianga, Mangonui, Whangaroa, Bay of Islands, and Whangarei with the rules of NZC Award applying.
2. The VHF Tane Mahuta Award for 20 contacts including at least one in each of the Locator Squares RF63, RF 64, RF65, RF74 and that part of RF73 north of 36° 30'; that is, with Sub-Squares ending in M to X. Contacts must be made from one square to another.
3. Portable and Mobile operation is permitted.
4. Multiple contacts are permitted provided the station contacted is located in a different County or Locator Square for each contact.
5. Repeater contacts are permitted if they are made through Northland repeaters at 6650, 6750, 6775, 7100, 7150, from outside the Northland area.
6. Contacts on or after January 1, 1985 are eligible.
7. QSL cards are not required.

Send certified list of relevant data. BUT for the VHF Award it is necessary to establish the full QTH Locator of the station worked.

8. Applications to Tane Mahuta Award, PO Box 10-078, Te Mai, Whangarei 0143, with cost as within New Zealand NZ\$5.00, Australia A\$5.00, others US\$5.00.

Trigtop Award

Aim 1: To contact operators from hilltops around the country.

Aim 2: To encourage people to venture up hilltops with amateur radio.

Brief Description

Log contacts you make with hilltop stations to accumulate contact points. Persons with top three points total per calendar year will receive a first, second or third award for that year. Persons scoring over 500,000 will receive an award.

Rules

- Contact may be made once with a trigtop station per day, per hilltop. If an operator stays at a trigtop overnight you may work him or her the next day. If an operator moves to another trigtop in the same day you may also rework him or her.
- Trigtop stations must be within 50m of a trig station as shown on any NZGD2000 Topo 50 map. These are shown by a solid or hollow triangle. "Spot heights" are not counted for this award.
- Operators may access a trig by any means. The mode of transport however will affect the score.
- An operator at a trigtop may claim the hilltop points for him or herself if he or she makes

one QSO with another amateur operator. They may self claim only once.

- Permission must be sought by the landowner to access trigtops on private land. Any reports of illegal trespassing will nullify all contacts made from the trig concerned. DOC land and public land is exempt from this. If you are within 50m of a trig and on public land you may claim the trig, provided you do not need to cross into private land at any time without permission.
- Stations must follow band plan and amateur rules to be eligible for the award.

Scoring

Base points – The altitude above sea level of the trigtop as shown on the 260 series maps.

Multiplier 1 – Mode of access to trigtop. X 2 for walking over 100m vertically or over 500m horizontally to the trigtop X1 for all other modes of transport accessing the site.

Multiplier 2 – Retransmission X 2 for simplex contacts.

X1 for contacts through repeaters, or other retransmission devices.

Multiplier 3 – Activation a Trig X 3 if you are the station at the trigtop

X1 if you are the station working the trigtop station

Exchange

A valid contact must exchange the following

- Callsign
- Signal Report
- Trigtop Name if known, or NZMG grid reference if not known.
- Trigtop height for scoring as shown on 260 series maps. Do not rely on GPS readings.
- Multipliers for scoring.

Logs

stations five. Contacts with DX members of WARO qualify for endorsements by endorsement application must contain at least three ZL contacts.

NZWARO VHF/ UHF Award

Stations work 10 WARO members on VHF or UHF (repeaters allowed). Endorsements for each additional five.

NZWARO Century Award

1. Applications to contain full log details of contacts with 100 NZWARO members (DX members included).
2. Contacts may be any mode, any band, and each member claimed must be a financial

A sample log is attached. Logs must carry the information exchanged in the QSO, and all scoring information. Logs should be submitted for the annual place getter prize in the month of January for the previous calendar year. Logs submitted to claim the award may be submitted at anytime.

Special Case

If one trigtop is working another trigtop, to claim both their and your own points, make two QSOs. The first for your own trigtop to claim for yourself. The second to claim the points of the trigtop you are working. This should be shown in the log as two QSOs.

Appendix 1 – Grid Reference

Map number and 6-figure grid are acceptable for this. Refer to the 260 series of maps for details on how to supply a 6-figure coordinate. State the map number and 6-figure grid in your log. These are accurate to 100m.

Appendix 2 – Multiplier 1

To claim 100m vertical walking, you must have started your tramp at a height above sea level 100m less than the trig. Thus you must have ascended at least 100m to get to the trig. To claim 500m horizontal, your tramp must have taken you over 500m of ground. This equates to half a square on 260 series maps. Meeting either of the above conditions makes you eligible for multiplier 1.

Enjoy this award

Warren Harris

ZL2AJ

warren@technaserve.com

Wairarapa Regional Award

This Award is sponsored by Branches 06, 46 and 82.

Requirements for Award:

work eight counties, 12 towns, 15 postcodes, three lakes, four hospitals, eight rivers, two aerodromes, two lighthouses and 23 museums/historic places. The Award can be worked in three stages: basic, upgrade and final. A check sheet for working the Award is available on written request with SASE, from the Awards Manager, PO Box 860, Masterton 5840.

This Award may be worked on all bands and all modes starting from 1 January 1997. The "Basic" award costs \$5.00. "Upgrade" and "Final" stickers are free on receipt of check sheet and SASE.

Waitomo Award ZL11Z

Make 10 points with Branch 55 contacts as follows: VHF Simplex or CW, two points; VHF or UHF Repeater, 1 point; HF Phone, one point; HF CW, two points; VHF or UHF Satellite, two points; Club Station ZL11Z, two points. Echolink or IRLP with branch members' one point.

Log details and \$5.00 to ZL11Z, I. M. Howitt, 3/49 Hinewai Street, Otorohanga 3900.

More info on www.qrz.com.

ZL11Z, AL1HJ, ZL4SQ, ZL1SQ-R

Club repeaters 147.375, 147.225

Wanganui Award

For contacts since 1 January 1982 with permanent residents in the Wanganui area — one point; with Wanganui-based Mobile stations regardless of location — one point; with ZL2JA — two points. Overseas stations require three points; ZLs require five points. (Repeater contacts acceptable.) QSO details with \$5.00 or five IRCs to Award Manager, 1 Caversham Road, Wanganui 4105.

WARO AWARDS

General

Contacts may be any mode, any band with NZWARO members who are financial at the time of the contact. No QSLs required. Send full log details certifying that the contacts have been made to Award Manager, Lynnette McDonald ZL1LL, 25 John Street, Pukekohe 2120, New Zealand, with sufficient postage for return of award.

NZWARO HF Award

ZL and VK stations work 10 WARO members resident in New Zealand, DX stations work five. Endorsement seals available to ZL and VK stations for each additional 10 contacts, DX

member of NZWARO at the time of the contact and may be counted once only.

NZWARO Mountain Buttercup Award

1. For contacts with licensed NZWARO members, resident, visiting, mobile, etc, in the 60 towns named in the official list. A WARO member working mobile, portable, etc, may claim the relevant town for her own credit. The same WARO member may be contacted in any number of towns.
2. Basic award is available for list of 15 contacts with endorsement seals for each further 10 contacts up to the

full 60 required. Applicants submitting a list of the full 60 valid contacts will receive a special award distinctive from the one gained for the lesser number of contacts.

3. Contacts may be any mode or any band, but each YL worked must be a financial member of NZWARO at the time of the contact and must be within a 25 km radius of the town claimed.

An official list of towns required to be worked is listed below or is available from the Manager on receipt of an SAE.

North Island

1. Auckland
2. Dannevirke
3. Dargaville

4. Eketahuna
5. Featherston
6. Gisborne
7. Hamilton
8. Hawera
9. Helensville
10. Kaikohe
11. Kaitia
12. Masterton
13. Matamata
14. Morrinsville
15. Napier
16. New Plymouth
17. Opotiki
18. Orewa
19. Otaki
20. Paihia
21. Palmerston North
22. Papakura
23. Putaruru
24. Rotorua
25. Taihape
26. Taumarunui
27. Taupo
28. Tauranga
29. Thames
30. Te Awamutu
31. Te Kuiti
32. Turangi

33. Upper Hutt
34. Waihi
35. Wairoa
36. Wanganui
37. Wellington
38. Wellsford
39. Whakatane
40. Whangarei
- South Island**
41. Alexandra
42. Ashburton
43. Balclutha
44. Blenheim
45. Christchurch
46. Cromwell
47. Dunedin
48. Gore
49. Greymouth
50. Hokitika
51. Invercargill
52. Kaikoura
53. Motueka
54. Nelson
55. Oamaru
56. Queenstown
57. Reefton
58. Timaru
59. Wanaka
60. Westport

OTC AWARD

Rules for the Award

Ten contacts with OTC (ZL) members, each contact worth one point, Phone or CW with an upgrade of 50 points.

The information required on each contact is: call-sign, date, time, name and OTC number. Contacts

must be on or after launch date 8 December 1995.

Logs with remittance of \$5.00 or IRCs to OTC Award Manager, 25 Annandale Street, New Plymouth 4310. Note that points may not be gained on the OTC National Net on Monday evenings.



NZART AWARDS

Award Notes

When applying for an award, whether through NZART or through an overseas Society, courtesy demands that you observe the following: (1) PRINT your name, address and call-sign; (2) Clearly state what award (and endorsements) you are applying for; (3) Supply checking sheet with call-signs, dates of QSOs, mode, etc.; (4) Enclose required funds (currency/IRC/stamps) as requested.

For NZART Awards

1. The usually accepted rules apply to all NZART awards.
2. NZART stresses the HONOUR SYSTEM. Awards applicants need NOT hold QSL cards for claimed contacts. It is sufficient to merely certify that the QSO was legitimately made. This no QSL rule applies ONLY to NZART sponsored awards.
3. Endorsements for mode/time/location etc., made at applicant's request.
4. New Zealand, US or Australian currency accepted instead of IRC but cheques NOT desirable. New Zealand stamps OK \$1, \$2 or \$3 preferred.
5. Post applications to NZART Awards Manager, PO BOX 1733, Christchurch Mail Centre, Christchurch 8140, New Zealand.

APPLICATION FORMS suitable for most awards are available from NZART Awards Manager (SASE Please) or on the web at www.nzart.org.nz/awards/index.html

COST OF AWARDS. NB — Cost given for awards are those for ZL applicants. Overseas applicants pay US\$5.00 for each NZART award or one IRC per \$1.00.

For Branch Awards

Logs need not be verified unless stated.

All awards are open to shortwave listeners unless stated.

The honour system also applies to Branch awards.

CJC

Captain James Cook Award

To perpetuate the memory of this world famous navigator and seaman—in three classes: Basic "Sailor Class" requires contacts with—G in Yorkshire; FO; ZL2; VK2; KH6 ... For "Officers Class"—"Sailor Class" contacts as well as ZL1, ZL3, ZL4, VK3, VK4, New Guinea, and any Antarctic station ... For "Command Class", as for "Officer Class" as well as any five of the following—VE2, VO, A35, YJ8, FK8, CE8, KL7.

Certified list (confirmations not required) with \$3.00, overseas US\$5.00, to NZART Awards Manager.

ENZART

A prestige award to honour NZART

1. In three parts — (A) Basic award requires 200 points with endorsements for 250, 300, 350 points. (B) Honour award requires 400 points with endorsements for each additional 50 points. (C) HONOUR PLAQUE for 500 points.
2. Points earned as follows by contacting an NZART member who is on the voting roll of the Branch concerned—Phone QSO, 1; CW QSO, 2; Club Station QSO, 2; YL op. QSO, 1; UHF, VHF QSO, 1; Mobile QSO, 1; AMSAT QSO, 1; Branch President QSO, 1.
3. It is essential to clearly determine that the operator contacted is a financial member of NZART and on the voting roll of the Branch concerned.
4. Contacts claimed with a Branch Station must be from a Clubroom or other permanent headquarters, or alternatively when the station is being operated in a contest, from an exhibition, or other activity of a similar kind. Contacts as a result of call-sign "swapping" at a member's QTH are not eligible.
5. Contacts with mobiles are

eligible only when the mobile station is within 50 km of his Branch's Clubrooms or his own QTH. (Note rule 3 above.)

6. One station may be claimed in several categories — e.g. the Branch President can be claimed for both Phone and for CW as well as for Branch President — but EACH claimed must be for a separate contact, and the contacts must be not less than 24 hours apart.
7. Contacts must be "Phone to Phone" or "CW to CW".
8. "Club Net" contacts are not eligible until the net concludes, while contacts made in an organized "awards net" with MC etc., are not eligible.
9. Permanent changes of QTH by claimant are permitted and likewise contacts made during genuine temporary operation.
10. ZL applicants must be members of NZART and all applicants must certify that each contact made fulfils award requirements. No QSL card need be held or submitted but applications must be made on special Check List—cost 10 cents plus SASE (large). Contacts must date 1 November 1976 or later.

11. Each certificate costs \$3.00, overseas US\$5.00. Endorsements free but SASE required. Overseas US\$1.00 Honour Plaque NZ\$10.00, overseas US\$12.00.
12. Applications to NZART Awards Manager.

IARU Region III Operating

Awards

To publicise Region III

1. The award is available to licensed amateurs and SWLs.
2. Contacts made after April 5 1982 are eligible.
3. QSL cards NOT required. Send certified list of eligible contacts from Log Book. Include country in log.
4. Cost is \$3.00, overseas US\$4.00.
5. Eligible countries are those in Region III whose amateur societies are members of IARU Region III Association. These are: Australia, Bangladesh, Brunei, China (PRC), Chinese Taipei (Taiwan), Fiji, French Polynesia, Hong Kong, India, Indonesia, Japan, Korea, Macau, Malaysia, New Caledonia, New Zealand, Pakistan, Papua New Guinea, Philippines, Pitcairn Island (VR6), Samoa, Singapore, Solomon Islands, Sri Lanka, Taiwan, Thailand, Tonga, Vanuatu, Vietnam. (One contact per country.)
6. PLUS: ONE or more Country credit from US Territories in the Pacific from Guam, Northern Marianas, American Samoa, Wake Island, Baker Howland Group, as presented by ARRL. Chagos Archipelago (VQ9), represented by RSGB. Current total of available "countries" is 34. Requirements for Award as from January 1 1986: Basic, seven areas; Silver Endorsement, 15 areas; Gold Endorsement, 20 areas. These to be reviewed as considered necessary by the custodian who would recommend appropriately to the Secretariat.
7. Awards may be endorsed for any mode or band.
8. Applications to NZART Awards Manager.

NZART Guiding Light Award

This award requires contacts with stations within 30 km of the more remote lighthouses and 10 km of the lighthouses near cities. Depending on the degree of difficulty each lighthouse has been allocated one to five points. A total of 20 points are required for the basic "Mariners" Award and 50 points for the "Master Mariners" Award.

The lighthouses

| <i>North Island</i> | <i>Points</i> | <i>km</i> |
|---------------------|---------------|-----------|
| Cape Reinga | 2 | 30 |
| Cape Brett | 1 | 30 |
| Mokohinau | 5 | 30 |
| Cuvier Island | 3 | 30 |
| Tiritiri Matangi | 1 | 10 |
| Bean Rock | 1 | 10 |
| East Cape | 2 | 30 |
| Portland Island | 2 | 30 |
| Castlepoint | 2 | 30 |
| Cape Palliser | 2 | 30 |
| Baring Head | 1 | 10 |
| Pencarrow | 1 | 10 |
| Somes Island | 1 | 10 |
| Cape Egmont | 1 | 30 |

South Island

| | | |
|-----------------|---|----|
| Cape Foulwind | 1 | 30 |
| Kahurangi Point | 3 | 30 |
| Farewell Spit | 2 | 30 |
| Boulder Bank | 1 | 10 |
| Stephens Island | 5 | 30 |
| The Brothers | 2 | 30 |
| Cape Campbell | 1 | 30 |
| Godley Head | 1 | 10 |
| Akaroa | 1 | 30 |
| Moeraki | 1 | 30 |
| Taiaroa Heads | 1 | 10 |
| Cape Saunders | 1 | 10 |
| Nugget Point | 2 | 30 |
| Waipapa Point | 2 | 30 |
| Dog Island | 1 | 30 |
| Centre Island | 1 | 30 |
| Puysegur Point | 5 | 30 |

Full log sheets available from Awards Manager. Eligible contacts for this award must be dated November 1 1998 or later. Cost of both awards \$5.00, overseas US\$5.00 or five IRC. Applications to NZART Awards Manager.

DOCLands Award

Purpose of Award

To promote the use of Amateur Radio within DOC Controlled Areas. To advertise Amateur Radio from these locations to the public. (*see table below*)

Date of Award

For contacts on or after 1 January 2003

Rules

A station can only be used for one point at each location per trip. If a station is operating from Lake Rotorua in the Nelson Lakes National Park, from the Sabine Hut, that station must state whether it is a National Park, Forestry Hut or Lake Station. The Transmitting station must be located within the boundaries of:

1. Forest Park for Forest Park Credit.

| To work stations operating from: | Basic | Intermediate | Advanced |
|----------------------------------|-------|--------------|----------|
| DOC Campsite | 2 | 4 | 6 |
| National Park | 1 | 2 | 3 |
| Forest Park | 1 | 3 | 5 |
| Lighthouse in DOC Control | 1 | 2 | 3 |
| Lake in DOC area | 1 | 2 | 3 |
| Forest Hut | 2 | 4 | 5 |
| DOC Controlled Land on Islands | | 1 | 2 |

2. National Park for National Park Credit.
3. within 1 km of a lake, within DOC boundaries for Lake credit.
4. Within 10 km of a lighthouse within DOC Boundaries for lighthouse credit, while the station itself must be within the boundaries of DOCLands.
5. Within viewing distance of a DOC Hut within DOC Boundaries for Forest Hut Credit.
6. On an Island controlled by DOC for Island credit. A station can claim itself for working stations from a location.

QSLs not required

Lakes: Lakes as per our Lakeside award, but those on DOCLands only

The log sheet includes the rules and a list of lighthouses on DOCLands is available from the NZART Awards Manager and will be available in PDF format on the awards section of the NZART web site.

MIA

Minor Islands Award

For contacts with minor islands of the New Zealand coast—e.g. Kapiti Island, Portland Island, Great Barrier Island, Little Barrier Island, Waiheke Island, D'Urville Island, Rangitoto Island, Kawau Island, Motutapu Island, etc., from which FIVE contacts are required. Certified list with \$3.00, overseas US\$5.00, to NZART Awards Manager.

1. So-called "islands" which are connected to the mainland by a causeway and rocks are not eligible.
2. The station must be located on the island or within the waters up to one nautical mile offshore, unless prevented by hazardous conditions.
3. Where public access is available, M/M stations must be on a mooring, ie, wharf, jetty, buoy, or anchor, or on arrival or departure from a mooring.

National Parks Award

1. For contacts made with stations operating WITHIN boundaries of a New Zealand National Park.
2. Basic award requires TWO contacts.

3. Usual NZART awards rules apply.
4. Endorsement: for each extra two contacts; for VHF Simplex; for VHF via repeater; for each amateur band; etc.
5. Duplicate Contacts (with SAME station) permitted ...
* on different amateur bands
* on different days
* from different Parks.
6. Eligible contacts to date from 1 January 1988.
7. Applications with \$3.00, overseas US\$5.00, to NZART Awards Manager.

NZ Armed Services Award

This award is presented by the Awards Net to remember all amateur radio operators who have served their country.

This award is open to all amateurs and SWLs.

All contacts made after August 1, 1992 will be eligible for this award.

All Amateur bands and modes may be used.

Repeater contacts accepted.

A station may only be contacted once.

Only one service number may be used.

ZL stations to work 100 contacts. VK stations to work 50 contacts. DX stations to work 30 contacts.

Information required: Log data, Service Number, Service in which served (ie, (A) Army, (AF) Air Force, (N) Navy.

Cost of Award: \$3.00, overseas US\$5.00.

Custodian: NZART Awards Manager.

Check sheet and rules also available from Awards Manager with SASE.

Provision for Award Update if required.

NZA — New Zealand Award

Available to all radio amateurs other than ZL.

Requirements:

35 contacts with ZL1.
plus 35 contacts with ZL2.
plus 20 contacts with ZL3.
plus 10 contacts with ZL4
plus one contact with ZL "territory" — either from New Zealand, Antarctica, Chatham Islands, Kermadec Islands, or Campbell Island. This one contact may be substituted by 20 ordinary ZL contacts if desired.

This makes a minimum of 101 contacts which should be dated from December 8, 1945. Cost overseas US\$5.00.

NZC — New Zealand Counties

Basic award required contacts with 20 different New Zealand Counties. Endorsements for 40, 60, 80, 100 are made with a special

certificate for 112. Map showing counties is depicted elsewhere in this section, while checking sheet is available from NZART Awards Manager.

1. Initial certificate with any or all endorsements to 100 costs \$3.00, overseas US\$5.00.
2. Separate endorsements to 100, after issue of basic award. Endorsement sticker send SASE overseas \$US1.00.
3. Special Certificate for "NZC 112" costs \$3.00, overseas US\$5.00.
4. Checking sheets which MUST be used and which are returned to applicant for record purposes cost SASE, overseas US\$2.00.
5. NZC "224" — the "224" Shield was instituted to recognize very outstanding achievement — that of "double 112" with different stations contacted in the relevant counties for each NZC 112. Current cost is \$15.00, overseas US\$25.00. Paper version available \$5.00 overseas \$US5.00. Applicants for NZC 224 must first hold TWO NZC 112 Awards. Send BOTH log sheets when applying for 224.
6. The operator on a "County DXpedition" whether Mobile or Fixed Portable may claim that County for his own NZC credit.
7. The original "Counties List" will be maintained irrespective of deletions or additions. The criteria will be the actual area of operation which must be determined by the honour of the operator.

NZLA — New Zealand Lakeside Award

1. For Basic Award, contacts are required with stations operating on the shores of TEN (10) freshwater lakes in New Zealand. Endorsements for each additional ten lakes up to 40; Honour Award for 50 lakes with further endorsement for each additional ten.
2. Stations must be located within ONE kilometre of the water or in a town on the lake shore.
3. Full rules are with the Check Sheets which MUST be used when applying for NZLA.
4. Basic Award costs \$3.00, overseas US\$5.00. Any endorsements SASE, overseas US\$1.00.
5. Check Sheets from NZART Awards Manager to whom all applications must be directed.
6. Eligible contacts must date May 1, 1976 or later. NOTE: Check Sheets are returned to applicant and make up a complete record of lakes

credited towards award. Basic work for this award was done for NZART by Mike Groth ZL1AHF.

NZART Century Award

Basic requirements

This award is based on the Maidenhead Locator System. The award is open to all amateurs and SWLs. One hundred different sub-squares are required for the Basic Century Award. (100 sub-squares) Certificates are available for 500, 1000, 1500, 2000, 3000 & 4000 sub-squares.

Each contact must state the full six digits of the Locator position, eg, RF66HK.

Eligible contacts must date January 1, 2000 or later.

Any operator on a "Century Award DXpedition" whether mobile or portable may claim the sub-square for their own credit.

Note

All contacts must be from the New Zealand mainland or surrounding islands.

Log sheets and maps, which give a broad outline of the Squares are available. The map supplied does not give an accurate position of the squares. Info maps that have latitude and longitude must be used for the position of the Sub-squares. For example, InfoMap series 242-1, 242-2, 242-3, 242-4, or similar.

Google maps <http://f6fvy.free.fr/qthLocator/fullScreen.php> will show your locator.

Cost Certificates NZ, A, US\$5.00 each.

Railways Award

To work amateurs within one kilometre of Railway Stations which are the stopping places for the "Northerner", the "Southerner" and Picton-Christchurch Express. (Auckland to Invercargill). Full rules on the Check sheet.

Application with \$3.00 or Check sheet, which contains full rules, is available, send SASE to; NZART Awards Manager.

NZR Regions Award

This award is similar to the NZ Counties Award but relates to the current Regional Districts.

Basic requirements

Initial certificates with four Regions and 18 Districts.

Stickers for 8/36 and 12/54 Regions and Districts.

Special award for all Regions and Districts.

Contacts must date 1 January 2000 or later.

Cost Basic award NZ\$5.00.

Endorsement sticker, send a SASE.

Overseas US or A\$5.00 or five IRCs. Endorsements \$2.00 or one

IRC.

All Regions and Districts Award

NZ\$5.00, US\$5.00 or A\$5.00.

Double Region Award \$15.00, overseas \$25.00.

Paper version available \$5.00, overseas \$US5.00.

Boundaries

The boundaries are as per InfoMaps 242B-1 to 242B-4 (four maps) and will remain to give a basis of stability.

Applications for the award must be on the log sheets which are available from the NZART Awards Manager. Send SASE or via e-mail (PDF file).

The following is a list of Districts (bold italic type) and the regions.

North Island Regions

Northland

Far North
Whangarei
Kaipara

Auckland

Rodney
North Shore
Waitakere
Auckland
Manukau
Papakura
Franklin*

Waikato

Thames-Coromandel
Hauraki
Waikato
Matamata Piako
Hamilton
Waipa
Otorohanga
South Waikato
Waitomo*
Taupo*

Bay of Plenty

Western Bay of Plenty
Tauranga
Rotorua*
Kawerau
Whakatane
Opotiki

Gisborne

Gisborne

Hawkes Bay

Wairoa
Hastings
Napier
Central Hawkes Bay

Taranaki

New Plymouth
Stratford
South Taranaki

Wanganui-Manawatu

Ruapehu
Wanganui
Rangitikei*
Manawatu
Palmerston North
Horowhenua
Taranui

Wellington

Masterton
Carterton
South Wairarapa
Kapiti Coast

Porirua
Upper Hutt
Lower Hutt
Wellington

South Island Regions

Nelson

Nelson

Marlborough

Marlborough

Tasman

Tasman

West Coast

Buller
Grey
Westland

Canterbury

Kaikoura
Hurunui
Selwyn
Waimakariri
Christchurch
Banks Peninsula
Ashburton
Mackenzie
Timaru
Waimate

Otago

Waitaki*
Queenstown-Lakes
Central Otago
Dunedin
Clutha

Southland

Gore
Southland
Invercargill

*Districts cross Regions boundaries.

Tiki Award

Work five different ZLs each on FIVE different bands dated post-war. Cost \$3.00, overseas US\$5.00.

ZL1 Award

Basic Award requires contacts with 125 different ZL1 stations dating post-war. Endorsements 175 and 250.

ZL2 Award

Basic Award requires contacts with 100 different ZL2 stations dating post-war. Endorsements for 150 and 200.

ZL3 Award

Basic Award requires contacts with 50 different ZL3 stations dating post-war. Endorsements for 75 and 100.

ZL4 Award

Basic Award requires contact with 25 different ZL4 stations dating post-war. Endorsements for 35 and 50.

Note: cost of ZL1/2/3/4 Certificates is \$3.00, overseas US\$5.00, each with any endorsements. Further endorsements send a SASE, overseas US\$1.00, UNLESS a new certificate is required instead of

"sticker", in which case the cost is as above. On issue, certificates will be endorsed for band/mode as requested and for any yearly period of time (January through December). Such endorsements are of course available to applicants at any time after the initial award has been made. ZL or ZM combination is OK. Applications with list to NZART Awards Manager.

VHFCC — VHF Century Club

One hundred points required from QSOs with ZL stations on the following basis:

- 50 MHz band contacts count 1 point.
- 144 MHz band simplex contacts count 3 points. Repeater contacts 1 point.
- 432 MHz band simplex contacts count 6 points. Repeater contacts 1 point.

(Further bands may be added in the future).

The same station may be claimed once on any one band but may be claimed repeatedly on different bands.

Endorsement stickers available for 200, 300, 400, 500 points. Cost \$3.00, overseas US\$5.00.

WAD — A VHF Award

Contacts required on any VHF band (or mixture of VHF bands) with ZL1, ZL2, ZL3, ZL4—One contact per Call Area. (Not out of Call Area callsigns.) Cost—\$3.00. Send stamps rather than coins or cheques. Overseas \$5.00 A or US.

Endorsements for Satellite QSOs.

Calcification of Call Area. For example, you can't claim ZL1 area if the ZL1 is in the ZL3 call area. You may claim the ZL1 for the ZL3 area if they are in the ZL3 area. Repeater contacts OK.

WAP — "Worked All Pacific"

Contacts required with 30 different "Oceania Countries". Eligible countries ... Any Oceania country, ie eligible as Oceania for WAC (see DXCC list). Cost \$3.00, overseas \$US5.00. Please include country on log sheet.

Five Band WAP

Contact any 30 eligible Pacific Countries (as counting for Oceania for WAC), each on FIVE different bands making a total of 150. (6, 7, 8 or 9 bands also available.)

Send list of log extracts (QSLs not required to be held) to Awards Manager ... with \$15.00, overseas US\$25.00.

AWARD: Wooden Shield surmounted with NZART badge and suitably inscribed.

Paper version available \$5.00, overseas \$US5.00.

WAZL — "Worked All New Zealand"

Contacts required for 45 different Branches of NZART— EXCEPT FOR OVERSEAS APPLICANTS (for whom only 35 are required). Special endorsement when WAZL completed within 12 month period. NB: Mobiles operating outside their own Branch Area must use the Branch Number of the area in which they are operating (for WAZL credit). Cost \$3.00, overseas US\$5.00 to NZART Awards Manager.

NZART Branches for WAZL

- 01 Ashburton
- 02 Auckland
- 03 Western Suburbs
- 04 Cambridge
- 05 Christchurch
- 06 Tararua
- 07 Not issued
- 08 Eastern Southland
- 09 Egmont (in recess)
- 10 Franklin
- 11 Gisborne
- 12 Hamilton
- 13 Hastings/Havelock North
- 14 Hawera (in recess)
- 15 Central Hawkes Bay (in recess)
- 16 Horowhenua
- 17 Huntly
- 18 Hutt Valley
- 19 Inglewood
- 20 Manawatu
- 21 Manukau
- 22 Marlborough
- 23 Marton and Districts
- 24 Motueka
- 25 Napier
- 26 Nelson
- 27 New Plymouth

- 28 Whangarei
- 29 North Shore
- 30 Otago
- 31 Pahiatua (in recess)
- 32 Rahotu Coastal (absorbed in Br 87)
- 33 Rotorua
- 34 South Canterbury
- 35 South Otago
- 36 South Westland (in recess)
- 37 Southland
- 38 Taumarunui (in recess)
- 39 Tauranga
- 40 Te Awamutu
- 41 Thames
- 42 Titahi Bay
- 43 Waihi and Districts
- 44 Matamata
- 45 Waimarino (in recess)
- 46 Wairarapa
- 47 Waitara
- 48 Wanganui
- 49 Westland
- 50 Wellington
- 51 Eastern Bay of Plenty
- 52 Northern Hawkes Bay (in recess)
- 53 Te Puke
- 54 Patea (absorbed in Br 87)
- 55 Waitomo
- 56 Christchurch West
- 57 Tokoroa
- 58 Helensville (in recess)
- 59 Mangakino (in recess)
- 60 Taupo
- 61 Central Otago
- 62 Reefton-Buller
- 63 Upper Hutt
- 64 North Otago
- 65 Papakura
- 66 Auckland VHF
- 67 Kawerau
- 68 North Canterbury
- 69 Kapiti
- 70 Feilding (in recess)
- 71 Rodney
- 72 Opotiki
- 73 Northern Wairoa (in recess)
- 74 Wellington VHF
- 75 Queenstown (in recess)
- 76 Kaikoura
- 77 Te Aroha (in recess)
- 78 Far North Districts
- 79 Howick and Districts (in recess)
- 80 Hibiscus Coast
- 81 Waikato
- 82 Southern Wairarapa
- 83 Raglan
- 84 Bay of Islands
- 85 Mercury Bay
- 86 Suburban
- 87 South Taranaki

88 Tauranga Emergency Communications Group

Yearly Award

This award is an annual award starting on 1 January and ending on 31 December each year.

The rules are as follows:

1. A total of 80 contacts required.
2. The numbers of years licensed must be obtained from station worked.
3. The licensed years are totalled to 1000 or more years.
4. Log details must include the operator's call-sign, name, licensed years and date worked.
5. The award is open to all SWLs who must include in addition to the above, both operators names and call-signs.
6. Logs must include at least 20 ZL contacts.
7. Send \$3.00, overseas US\$5.00, to the NZART Awards Manager.

"5 × 5"—Five by Five

This premier award has been instituted to recognize the increasing interest in Five Band DX operation. The initial award requires that the same station be contacted on five bands repeated with five different DXCC countries. First endorsement after a further five has been contacted (total of 10) with the 20 endorsement requiring another ten and so on to 100. Certified list with full QSO data and fee of \$3.00, overseas US\$5.00, which includes all endorsements. Certificate is outstanding and is overprinted in embossed gold. Contacts must date from 1945.

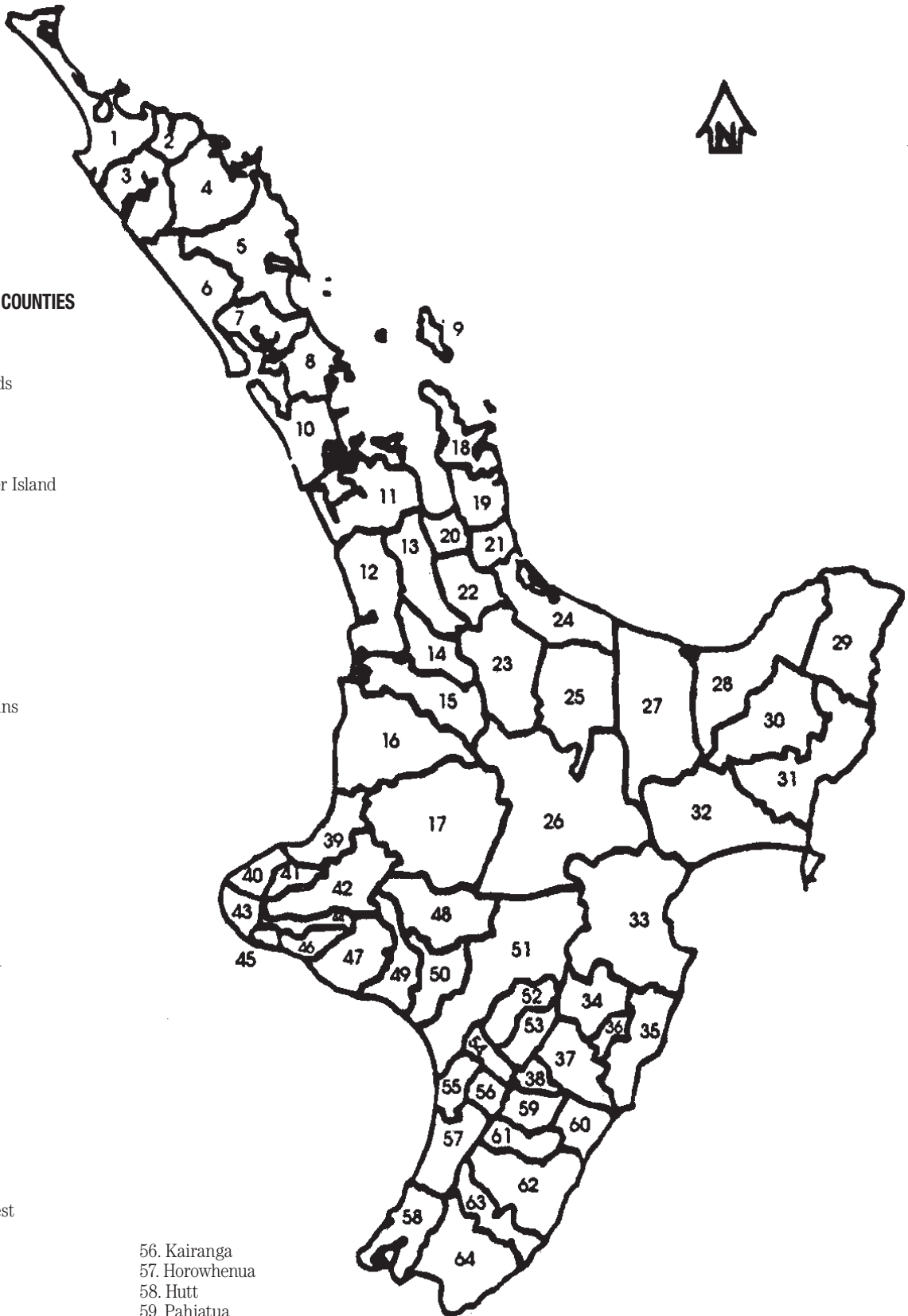
ZLA Award

Contacts required with Auckland City, Wellington City, Christchurch City, Dunedin City, Antarctica ZL5, Campbell Island, Chatham Island, Kermadec Island. Applicants must send certified list to NZART Awards Manager with \$3.00, overseas US\$5.00.

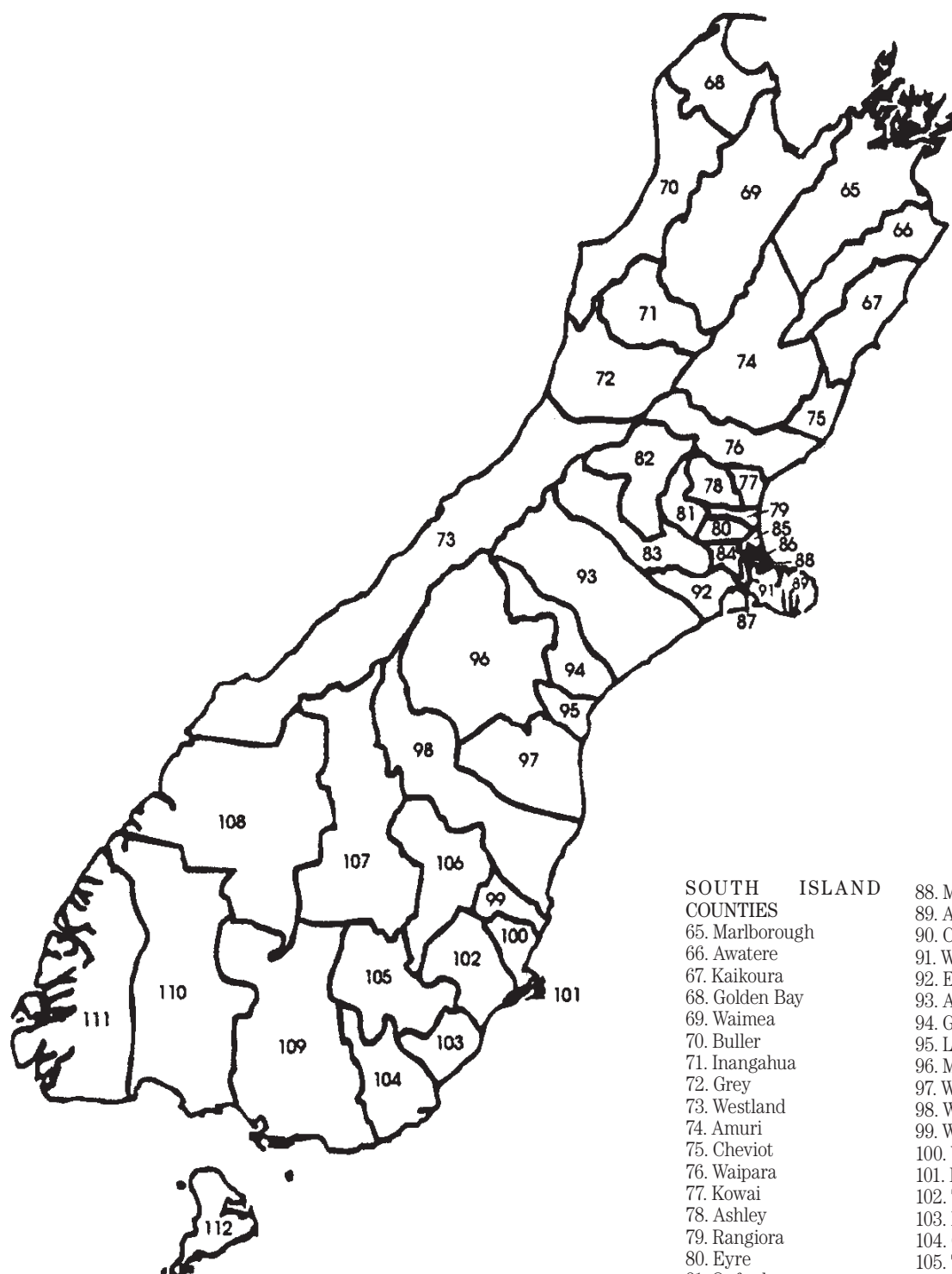
NORTH ISLAND COUNTIES

NORTH ISLAND COUNTIES

1. Mangonui
2. Whangaroa
3. Holianga
4. Bay of Islands
5. Whangarei
6. Hobson
7. Otamatea
8. Rodney
9. Great Barrier Island
10. Waitemata
11. Franklin
12. Raglan
13. Waikato
14. Waipa
15. Otorohanga
16. Waitomo
17. Taumarunui
18. Coromandel
19. Thames
20. Hauraki Plains
21. Ohinemuri
22. Piako
23. Matamata
24. Tauranga
25. Rotorua
26. Taupo
27. Whakatane
28. Opotiki
29. Waiapu
30. Waikohu
31. Cook
32. Wairoa
33. Hawke's Bay
34. Waipawa
35. Patangata
36. Waipukurau
37. Dannevirke
38. Woodville
39. Clifton
40. Taranaki
41. Inglewood
42. Stratford
43. Egmont
44. Eltham
45. Waimate West
46. Hawera
47. Patea
48. Waimarino
49. Waitotara
50. Wanganui
51. Rangitikei
52. Kiwitea
53. Pohangina
54. Oroua
55. Manawatu
56. Kairanga
57. Horowhenua
58. Hutt
59. Pahiatua
60. Akitio
61. Eketahuna
62. Masterton
63. Wairapa South
64. Featherston



SOUTH ISLAND COUNTIES



SOUTH ISLAND COUNTIES

- | | |
|-----------------|---------------------|
| 65. Marlborough | 88. Mount Herbert |
| 66. Awatere | 89. Akaroa |
| 67. Kaikoura | 90. Chatham Islands |
| 68. Golden Bay | 91. Wairera |
| 69. Waimea | 92. Ellesmere |
| 70. Buller | 93. Ashburton |
| 71. Inangahua | 94. Geraldine |
| 72. Grey | 95. Levels |
| 73. Westland | 96. Mackenzie |
| 74. Amuri | 97. Waimate |
| 75. Cheviot | 98. Waitaki |
| 76. Waipara | 99. Waihemo |
| 77. Kowai | 100. Waikouaiti |
| 78. Ashley | 101. Peninsula |
| 79. Rangiora | 102. Taieri |
| 80. Eyre | 103. Bruce |
| 81. Oxford | 104. Clutha |
| 82. Tawera | 105. Tuapeka |
| 83. Malvern | 106. Maniototo |
| 84. Paparua | 107. Vincent |
| 85. Waimairi | 108. Lake |
| 86. Heathcote | 109. Southland |
| 87. Halswell | 110. Wallace |
| | 111. Fiord |
| | 112. Stewart Island |

FIXED LOCATION STATIONS

Updated as at 27 June 2010

The engineering details in these tables are from the MED's SMART Database ©MED.

Additions and modifications to the engineering details are only possible by making a licence application.

Licence applications via the MED cost \$400, whereas licence applications via NZART cost \$50.

Licence applications via NZART should be made on NZART Form 10, available on the FMTAG section of the NZART website.

Note on update status:

C in the right-hand column indicates that the station is under construction or is temporarily off-air.

N in the right-hand column indicates that the Branch has not responded, by the cut-off date, to the May 2010 FMTAG information update request.

Note on repeater input/output offsets:

Most repeaters receive LOW and transmit HIGH, except 7025 to 7375 on 2 metres, and the 434.xxx National System repeaters.

6m Repeater

User transmits 1 MHz lower. Vertical polarisation.

| Station Name | Frequency | MED Site Name | Topo50 Map Ref | Branch | Trustee 1 | Trustee 2 |
|----------------|-----------|---------------|----------------|--------|-----------|-----------|
| Alexandra 3625 | 53.6250 | FRUITLANDS | CD13 043 718 | 61 | ZL4THT | ZL4GP |
| Auckland 3725 | 53.7250 | KLONDYKE ROAD | BC32 602 642 | 66 | ZLITGC | ZL1BK |
| Cass Peak 385 | 53.8500 | CASS PEAK | BX24 697 684 | CA | ZL2BCF | ZL3TMB |

2m Repeater

User transmits 600 kHz lower for repeater output frequencies of 145.325 to 147.000 MHz. Vertical polarisation.

User transmits 600 kHz higher for repeater output frequencies of 147.025 to 147.375 MHz. Vertical polarisation.

| Station Name | Frequency | MED Site Name | Topo50 Map Ref | Branch | Trustee 1 | Trustee 2 |
|---------------------------|-----------|-------------------|----------------|--------|-----------|-----------|
| Rotorua Linear 435 | 144.3500 | MOERANGI HEIGHTS | BE37 967 778 | 33 | ZL1PJ | ZL1BWC |
| Kapiti Voice and Data 535 | 145.3500 | MT FIELD | BP32 775 757 | 69 | ZL2GO | ZL4VV |
| Opunake 540 | 145.4000 | KIRI ROAD | BJ29 860 396 | 87 | ZL2QP | ZL2ADU |
| Brynderwyn 560 | 145.6000 | PILBROW HILL | AY30 277 076 | 28 | | N |
| Ward 560 | 145.6000 | WELD CONE | BS29 972 665 | 22 | ZL2BK | ZL2WD |
| Tararua Voice & Data 5625 | 145.6250 | MT BUTTERS | BN36 572 057 | O6 | ZL2KA | ZL2KG |
| Canterbury 5625 | 145.6250 | CASS PEAK | BX24 697 684 | CA | ZL2BCF | ZL3TMB |
| Raglan 5675 | 145.6750 | TE UKU | BD32 733 067 | 81 | ZLITAT | ZL1THG |
| Manawatu 5725 | 145.7250 | PAHIATUA TRACK | BM35 316 240 | 20 | ZL2FX | ZL2WD |
| Auckland 5775 | 145.7750 | MUSICK POINT | BA32 695 203 | 86 | ZL1BFB | ZL1TRH |
| Invercargill 5775 | 145.7750 | BLUFF HILL | CH10 432 270 | 37 | ZL4OX | ZL4CSS |
| Auckland 6625 | 146.6250 | KLONDYKE ROAD | BC32 602 642 | 66 | ZLITGC | ZL1BK |
| Timaru 6625 | 146.6250 | MT HORRIBLE | CA19 460 818 | 34 | ZL3GL | ZL3OZ |
| Whangarei 665 | 146.6500 | PARAKIORE | AX30 160 532 | 28 | | N |
| Wharite 665 | 146.6500 | WHARITE | BM35 430 401 | O6 | ZL2KA | ZL2KG |
| Dunedin 665 | 146.6500 | HIGHCLIFF | CE17 133 163 | 30 | ZL4JH | ZL4GR |
| Auckland 670 | 146.7000 | RUAOTUWHENUA | BA31 383 125 | 66 | ZLITGC | ZL1SLO |
| Hawkes Bay 670 | 146.7000 | KAHURANAKI | BK39 316 877 | 13 | ZL2AJ | ZL2DW |
| Motueka 670 | 146.7000 | MT CAMPBELL | BP24 876 475 | 24 | ZL2BCG | ZL2ASF |
| Oamaru 670 | 146.7000 | STATION PEAK | CB17 073 418 | 64 | ZL4DB | ZL4SN |
| Bay of Islands 675 | 146.7500 | MANGINANGINA | AV28 734 034 | 84 | ZL1IU | ZL1RS |
| Taupo 675 | 146.7500 | MAROANUI | BF36 634 324 | 60 | ZL1BU | ZL1KU |
| Titahi Bay 675 | 146.7500 | ONEPOTO RESERVOIR | BP31 553 476 | 42 | ZL2TKY | ZL2AZ |
| Westport 675 | 146.7500 | CAPE FOULWIND | BR20 724 769 | 62 | | N |
| Mount Grey 675 | 146.7500 | MT GREY | BW23 632 256 | 35 | ZL4FZ | |
| Balclutha 675 | 146.7500 | KURIWAO | CF13 204 730 | | ZL4TL | ZL4AM |

| | | | | | | | |
|---------------------------------|----------|------------------|--------------|----|--------|--------|-------------|
| Akatere 6775 | 146.7750 | AKATERE | AU28 606 261 | 78 | | | N LINKED |
| Taihape 6775 | 146.7750 | MATAROA | BK35 344 024 | 23 | ZL2KC | ZL2ADL | |
| Tauranga 680 | 146.8000 | MINDEN AMATEUR | BD36 692 218 | 39 | ZL1TAJ | ZL1BVA | |
| Poverty Bay 680 | 146.8000 | KAITI HILL | BG43 378 069 | 11 | ZL2TRG | ZL2HC | |
| Masterton 680 | 146.8000 | RANGITUMAU | BP35 307 749 | 46 | ZL2BA | ZL4JS | |
| Murchison 680 | 146.8000 | MT MURCHISON | BR23 583 801 | 26 | ZL2BCA | ZL2RP | |
| Tekapo 680 | 146.8000 | MT ROLLESBY | BZ17 092 075 | 34 | ZL3GL | ZL3OZ | LINKED |
| Invercargill 680 | 146.8000 | BALD HILL | CF08 010 743 | 37 | ZL4OX | ZL4CSS | |
| Arowhana 685 | 146.8500 | AROWHANA | BE43 262 703 | 11 | ZL2TRG | ZL2HC | |
| Kapiti 685 | 146.8500 | MT FIELD | BP32 775 757 | 69 | ZL2GO | ZL4VV | |
| Queenstown 685 | 146.8500 | REMARKABLES | CC11 694 014 | 75 | ZL4JW | | C LINKED |
| Auckland 690 | 146.9000 | MT PUKETUTU | BB32 795 816 | 66 | ZL1JD | ZL1UET | |
| Gisborne 690 | 146.9000 | WHAKAPUNAKE | BH42 992 917 | 11 | ZL2TRG | ZL2HC | |
| Wanganui 690 | 146.9000 | WANGANUI | BK32 755 884 | 48 | ZL2THO | ZL1BNB | |
| Kaikoura 690 | 146.9000 | KAIKOURA | BT27 573 033 | 22 | ZL2BK | ZL2WD | |
| Dunedin 690 | 146.9000 | MT CARGILL | CE17 101 239 | 30 | ZL4JH | ZL4GR | |
| Waikato 695 | 146.9500 | MT TE AROHA | BC35 422 422 | 81 | ZL1TAT | ZL1THG | |
| Blenheim 695 | 146.9500 | THE NED | BR28 767 893 | 22 | ZL2BK | ZL2WD | LINKED |
| Greymouth 695 | 146.9500 | SEWELL PEAK | BT19 636 036 | 49 | ZL3ADH | ZL3TY | |
| Waitaki 695 | 146.9500 | MT STUDHOLME | CA18 353 531 | 34 | ZL3GL | ZL3OZ | |
| Gore 695 | 146.9500 | MCLEODS HILL | CF12 800 932 | 08 | ZL4TCS | ZL4GL | |
| Tairua 6975 | 146.9750 | TAIRUA | BB35 505 046 | 85 | ZL1AAF | ZL1BCJ | |
| North Canterbury 6975 | 146.9750 | MT NOBLE | BV23 502 536 | 68 | ZL3AI | ZL4WX | |
| Edgecumbe 700 | 147.0000 | PUTAUAKI | BE39 275 759 | 67 | ZL1CAY | ZL1OW | |
| Lower Hutt 700 | 147.0000 | MT FITZHERBERT | BQ32 644 351 | 18 | ZL2TVM | ZL2TWS | |
| Alexandra 700 | 147.0000 | FRUITLANDS | CD13 043 718 | 61 | ZL4THT | ZL4GP | |
| Nelson 7025 | 147.0250 | GRAMPIANS | BQ26 234 283 | 26 | ZL2BCA | ZL2RP | |
| Egmont 705 | 147.0500 | MT EGMONT | BJ29 952 487 | 87 | ZL2AFE | ZL2UFN | LINKED |
| Christchurch 705 | 147.0500 | MARLEYS HILL | BX24 704 714 | 05 | | | N |
| Mercury Bay 7075 | 147.0750 | KAKATARAHAE | BA34 280 138 | 85 | ZL1AAF | ZL1BCJ | |
| Colonial Knob Voice & Data 7075 | 147.0750 | COLONIAL KNOB | BP31 513 426 | 74 | ZL3TC | ZL4JY | |
| Far North 710 | 147.1000 | MAUNGATAUREIA | AV27 432 083 | 78 | | | LINKED |
| Belmont 710 | 147.1000 | MT BELMONT | BQ32 569 399 | 74 | ZL3TC | ZL2TVM | |
| Manawatu 7125 | 147.1250 | PAHIATUA TRACK | BM35 316 240 | 20 | ZL2FX | ZL2WD | |
| Taumarunui 715 | 147.1500 | MT HIKURANGI | BG33 998 037 | 38 | ZL1UTH | ZL1TIG | |
| Southern Wairarapa 715 | 147.1500 | THE KNOLL | BQ33 026 387 | 82 | ZL2BLM | ZL2SJ | |
| Westport 715 | 147.1500 | MT FREDERICK | BR21 040 823 | 62 | | | N |
| Te Puke 7175 | 147.1750 | SHAW ROAD | BE37 870 015 | 53 | ZL1MOF | ZL1TAJ | |
| Pariwhariki 7175 | 147.1750 | PARIWHARIKI TRIG | BP35 289 460 | 46 | ZL2BA | ZL4JS | |
| New Plymouth 720 | 147.2000 | ROBE STREET | BH29 928 758 | 27 | ZL2BR | ZL2BZH | |
| Nelson 720 | 147.2000 | SADDLE HILL | BQ27 362 306 | 26 | ZL2BCA | ZL2RP | |
| Doubtless Bay 7225 | 147.2250 | RANGIAWHIA | AU26 357 416 | 78 | | | N LINKED |
| Hairini 7225 | 147.2250 | PUAHUE ROAD | BE34 075 892 | 55 | ZL4SQ | ZL1HJ | |
| Picton 7225 | 147.2250 | MT FREETH | BQ28 824 286 | 22 | ZL2BK | ZL2WD | LINKED |
| Whangarei 725 | 147.2500 | HOROKAKA | AX29 025 299 | 28 | | | N |

| | | | | | | | |
|-----------------|----------|-----------------|--------------|----|--------|--------|--------|
| Napier 725 | 147.2500 | TARAPONUI | BH38 233 618 | 25 | ZL2TC | ZL2DW | |
| Canterbury 725 | 147.2500 | HERBERT PEAK | BX24 792 627 | 05 | | | N |
| Kakaramea 7275 | 147.2750 | KAKARAMEA | BH35 336 825 | 38 | ZL1UTH | ZL1TIG | |
| Rodney 730 | 147.3000 | SCHOLLUM ACCESS | AZ31 490 616 | 71 | | | N |
| Whakatane 730 | 147.3000 | WHAKATANE | BE40 528 888 | 51 | ZL1NI | ZL1BCW | |
| Climie 730 | 147.3000 | MT CLIMIE | BP33 801 431 | 63 | ZL2HM | ZL2BRG | |
| Ponga 7325 | 147.3250 | PONGA HILL | BB32 782 912 | 86 | ZL1BFB | ZL1TRH | |
| Barton 7325 | 147.3250 | MT BARTON | BR33 952 969 | 46 | ZL2BA | ZL4JS | |
| Rotorua 735 | 147.3500 | MOERANGI | BE37 903 691 | 33 | ZL1PJ | ZL1BWC | |
| Rewa 735 | 147.3500 | REWA | BP35 507 506 | 46 | ZL2BA | ZL4JS | |
| Waitomo 7375 | 147.3750 | RANGITOTO | BF34 110 510 | 55 | ZL4SQ | ZL1HJ | |
| Golden Bay 7375 | 147.3750 | TAKAKA HILL | BP25 883 586 | 24 | ZL2BCG | ZL2VBO | LINKED |

23cm REPEATERS

User transmits 20 MHz lower (except Mt. Victoria). Vertical polarisation.

| Station Name | Frequency | MED Site Name | Topo50 Map Ref | Branch | Trustee 1 | Trustee 2 |
|-----------------|-----------|----------------|----------------|--------|-----------|-----------|
| Mt Victoria 120 | 1271.2000 | MT VICTORIA | BQ31 504 269 | 74 | ZL3TC | ZL4JY |
| Auckland 190 | 1291.9000 | GLENFIELD ROAD | BA31 538 263 | 66 | ZL1TGC | ZL1JD |

70cm REPEATERS

User transmits 5 MHz lower for 438.xxx and 439.xxx. Vertical polarisation.
User transmits 5 MHz higher for 433.xxx and 434.xxx. Vertical polarisation.
National System repeaters are listed in another table.

| Station Name | Frequency | MED Site Name | Topo50 Map Ref | Branch | Trustee 1 | Trustee 2 | |
|-------------------|-----------|------------------|----------------|--------|-----------|-----------|-------------------|
| Hakes Bay 270 | 432.7000 | MT THREAVE | BK39 241 930 | 13 | ZL2AJ | ZL2DW | VOIP SIMPLEX |
| Wairarapa 3825 | 433.8250 | PARIWHARIKI TRIG | BP35 289 460 | 46 | ZL2BA | ZL4JS | |
| Mosgiel 820 | 438.2000 | SADDLE HILL RD | CE16 957 129 | 30 | ZL4JH | ZL4GR | SIMPLEX |
| Ponga 825 | 438.2500 | PONGA HILL | BB32 782 912 | 86 | ZL1BFB | ZL1TRH | |
| Dunedin 830 | 438.3000 | HIGHCLIFF | CE17 134 163 | 30 | ZL4JH | ZL4GR | SIMPLEX LINKED |
| Christchurch 840 | 438.4000 | MARLEYS HILL | BX24 705 712 | CA | ZL3MJS | ZL3TMB | |
| Waikato 840 | 438.4000 | TE AROHA | BC35 422 422 | 81 | ZL1TAT | ZL1THG | |
| Taraponui 8425 | 438.4250 | TARAPONUI | BH38 233 618 | 25 | ZL2TC | ZL2DW | |
| Lower Hutt 8425 | 438.4250 | BIRCH STREET | BQ32 611 359 | 18 | ZL2TVM | ZL2TWS | |
| Blenheim 845 | 438.4500 | TUAMARINA | BQ28 784 163 | 22 | ZL2BK | ZL2WD | |
| Auckland 845 | 438.4500 | KLONDYKE ROAD | BC32 602 642 | 66 | ZL1TGC | ZL1BK | |
| New Plymouth 8475 | 438.4750 | CARRINGTON ROAD | BH29 873 616 | 27 | ZL2BR | ZL2BZH | C |
| Cass Peak 850 | 438.5000 | CASS PEAK | BX24 697 684 | 56 | ZL3VI | ZL2BCF | |
| Manawatu 8525 | 438.5250 | PAHIATUA TRACK | BM35 316 240 | 20 | ZL2FX | ZL2WD | |
| Te Puke 855 | 438.5500 | SHAW ROAD | BE37 870 015 | 53 | ZL1MOF | ZL1TAJ | |
| Greymouth 8575 | 438.5750 | SEWELL PEAK | BT19 636 036 | 49 | ZL3ADH | ZL3TY | LINKED |
| Manurewa 8575 | 438.5750 | MANUREWA | BB32 701 047 | 86 | ZL1UET | ZL1BFB | |
| Hunua 860 | 438.6000 | GILLESPIE ROAD | BB33 805 921 | | ZL1BNQ | ZL1AVR | |
| Climie 860 | 438.6000 | MT CLIMIE | BP33 801 431 | 63 | ZL2HM | ZL2BRG | |
| Taihape 865 | 438.6500 | CLEAVERS HILL | BK35 356 211 | 23 | ZL2KC | ZL2ADL | |
| Oamaru 865 | 438.6500 | CAPE WANBROW | CC18 405 023 | 64 | ZL4DB | ZL4SN | |
| Invercargill 870 | 438.7000 | INVERCARGILL | CG10 434 502 | 37 | ZL4OX | ZL4CSS | |

70cm REPEATERS

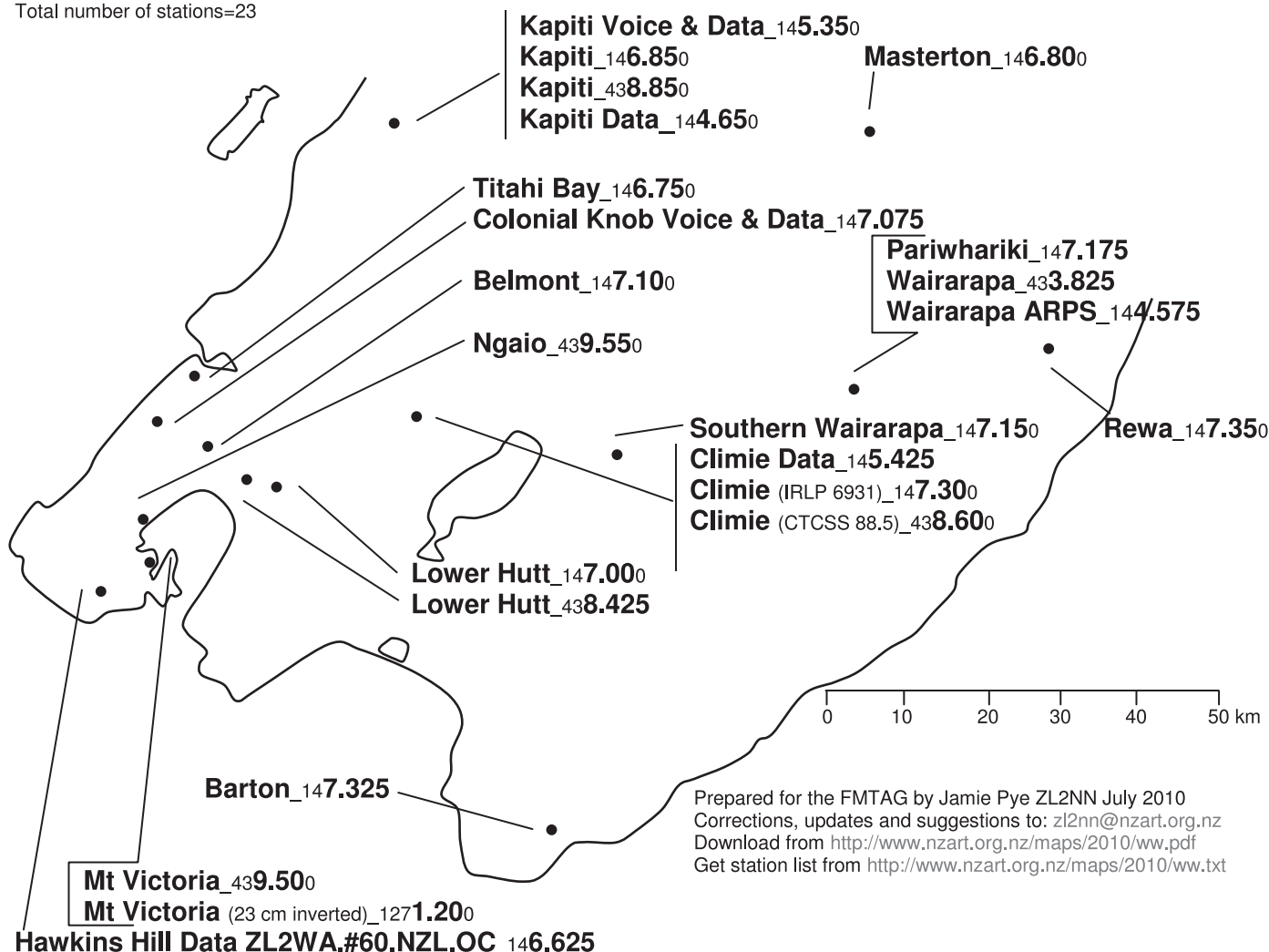
User transmits 5 MHz lower for 438.xxx and 439.xxx. Vertical polarisation.
 User transmits 5 MHz higher for 433.xxx and 434.xxx. Vertical polarisation.
 National System repeaters are listed in another table.

| Station Name | Frequency | MED Site Name | Topo50 Map Ref | Branch | Trustee 1 | Trustee 2 |
|--------------------------|-----------|-----------------|----------------|--------|-----------|--------------|
| Whangarei 870 | 438.7000 | PARAHAKI | AX30 211 471 | 28 | | N |
| Hawkes Bay 870 | 438.7000 | TE MATA | BK39 348 987 | 13 | ZL2AJ | ZL2DW LINKED |
| Waitomo 870 | 438.7000 | RANGITOTO | BF34 110 510 | 55 | ZL4SQ | ZL1HJ |
| Egmont 880 | 438.8000 | MT EGMONT | BJ29 952 487 | 87 | ZL2AFE | ZL2UFN |
| Timaru 885 | 438.8500 | MT HORRIBLE | CA19 460 818 | 34 | ZL3GL | ZL3OZ |
| Tauranga 885 | 438.8500 | PAPAMOA | BD37 895 185 | 39 | ZL1TAJ | ZL1BVA |
| Kapiti 885 | 438.8500 | MT FIELD | BP32 775 757 | 69 | ZL2GO | ZL4VV |
| Nelson 890 | 438.9000 | FRINGED HILL | BQ26 266 268 | 26 | ZL2BCA | ZL2RP |
| Hawkes Bay 9175 | 439.1750 | CLIFTON TRIG | BK39 440 042 | 13 | ZL2AJ | ZL2DW |
| Mt Victoria 950 | 439.5000 | MT VICTORIA | BQ31 504 269 | 74 | ZL3TC | ZL2TVM |
| Gisborne 950 | 439.5000 | TE KAPUA | BG43 242 289 | 11 | ZL2TRG | ZL2CC |
| Ngaio 955 | 439.5500 | NGAIO RESERVOIR | BQ31 494 316 | 74 | ZL3TC | ZL2SX |
| Wharite Voice & Data 960 | 439.6000 | WHARITE | BM35 431 399 | 06 | ZL2KA | ZL2KG LINKED |

Wellington & Wairarapa Amateur Radio UHF & VHF Repeaters 2010

NOTE 1. The **naming system** is explained on the map **New Zealand Amateur Radio ATV Repeaters 2010**.
2. Repeater Offsets (splits) are explained on the map **New Zealand Amateur Radio National System 2010**

Total number of stations=23



North Island Amateur Radio 6 m & 2 m (VHF) Repeaters 2010

NOTE 1. The **naming system** is explained on the map **New Zealand Amateur Radio ATV Repeaters 2010.**

2. Repeater Offsets (splits) are explained on the map **New Zealand Amateur Radio National System 2010**

2 m

User transmits 600 kHz lower for repeater output frequencies of 145.325 to 147.000 MHz. User transmits 600 kHz higher for repeater output frequencies of 147.025 to 147.375 MHz. Vertical polarisation.

6 m

User transmits 1 MHz lower. Vertical polarisation.

Number of stations on this map=43

Linked

Doubtless Bay_147.225

Akaterere 146.775

Far North 147.100

Bay of Islands_146.750

Whangarei_146.650

Whangarei 147.250

Brynderwyn 145.600

Rodney 147.300

Mercury Bay 147.075

Tairua 146,975

Waikato (IRLP 6549) 146.950

Tauranga 146.800

Te Puke 147.175

Rotorua Linear 144.350

Edgcumbe (IRLP 6394) 147.000**Whakatane** 147.300

Arowhana 146.850

Poverty Bay (IRLP 6105) 14**6.800**

Gisborne 146.900

Napier (IRLP 6793) (CTCSS 71.9) 14**7.250**

- Hawkes Bay 870 is linked to Wharite 665

~~Hawkes Bay~~ 146.700

— **Wharite** 146.650 (Linked to HB 870)

- Tararua Voice & Data 145.625

For this area see
Wellington & Wairarapa Map (W&W)

0 100 200 km

Prepared for the FMTAG by Jamie Pye ZL2NN July 2010

Corrections, updates and suggestions to: zl2nn@nzart.org.nz

Download from <http://www.nzart.org.nz/maps/2010/v-ni.pdf>

INTERNET RADIO LINKING PROJECT (IRLP)

For information see <http://www.irlp.net/> or

<http://homepages.xnet.co.nz/~rosvonne/EcholinkWebpage/Echolinkmapn.pdf>

South Island Amateur Radio 6 m & 2 m (VHF) Repeaters 2010

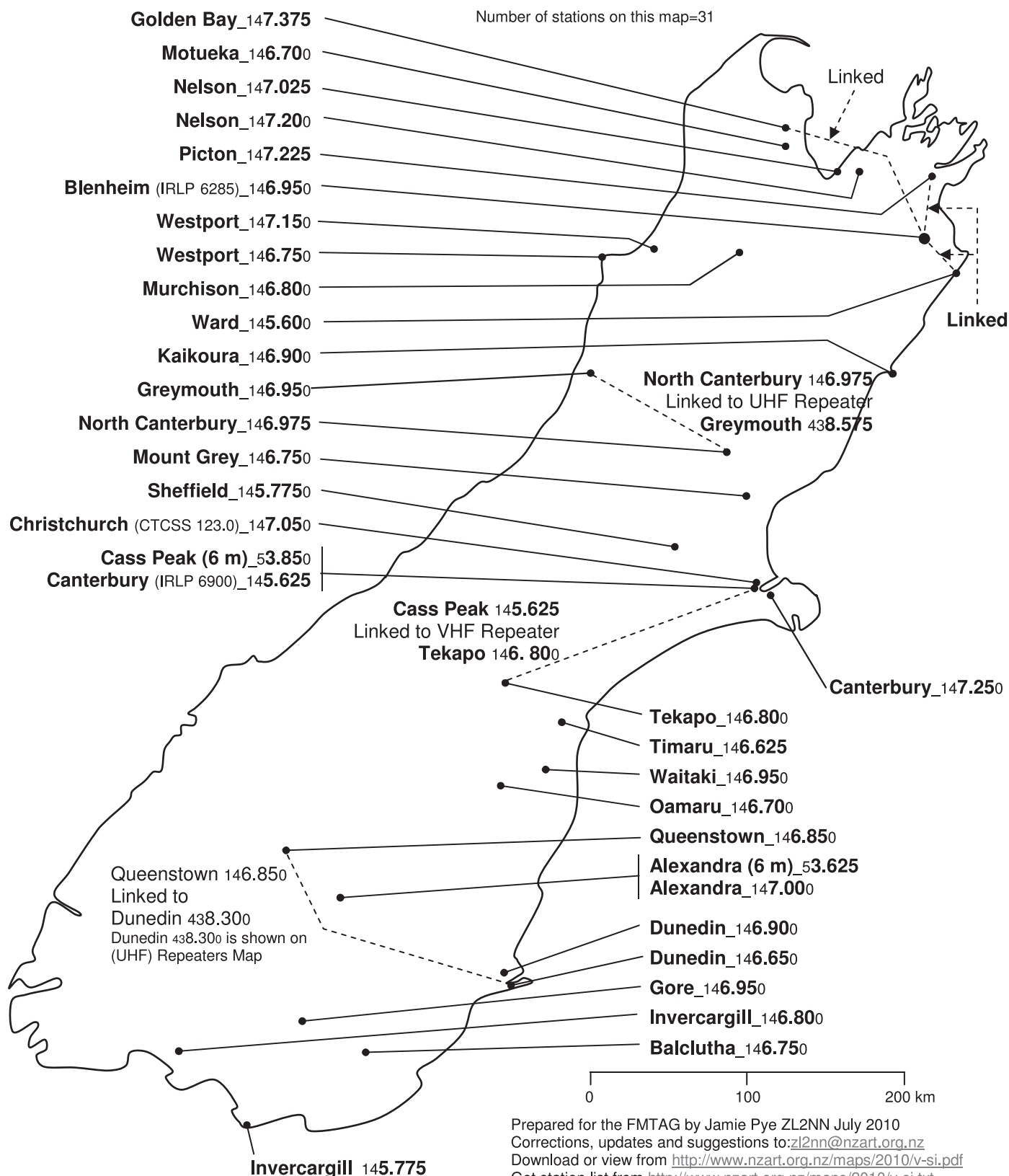
NOTE 1. The **naming system** is explained on the map for **New Zealand Amateur Radio ATV Repeaters 2010**.

2. Repeater Offsets (splits) are explained on the map for **New Zealand Amateur Radio National System 2010**.

3. IRLP in the **South Island** is on: **Blenheim 695 IRLP 6285** and **Cass Peak 5625 IRLP 6900**.

4. ZL4DM Dunedin 147.425 IRLP 6184 is not shown on these maps. For further details see <http://www.irlp.net/>

5. 2 m User transmits 600 kHz lower for repeater output frequencies of 145.325 to 147.000 MHz. User transmits 600 kHz higher for repeater output frequencies of 147.025 to 147.375 MHz. Vertical polarisation. **6. 6 m** User transmits 1 MHz lower. Vertical polarisation



New Zealand Amateur Radio 70 & 23 cm (UHF) Repeaters 2010

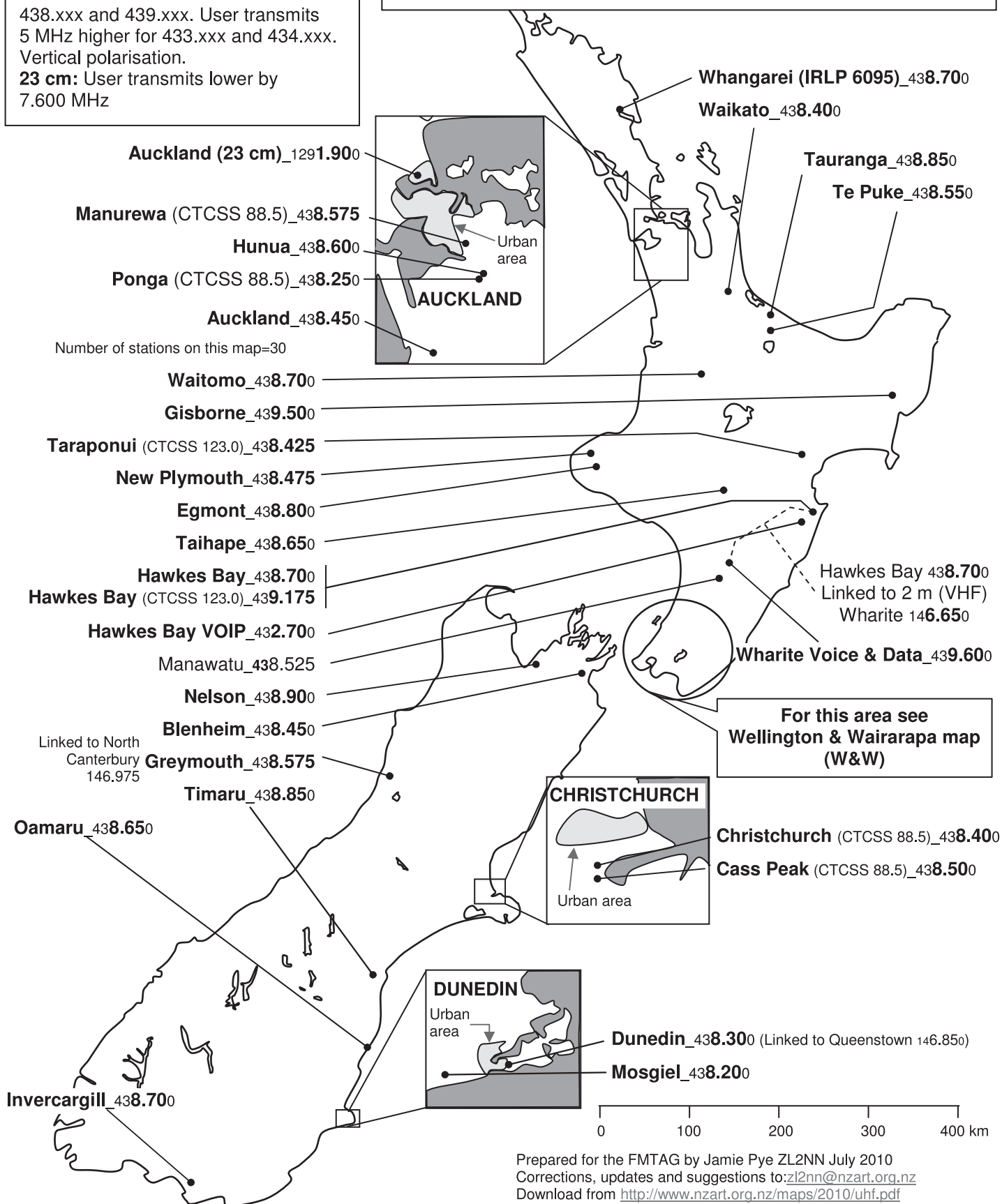
NOTE 1. The **naming system** is explained on the map **New Zealand Amateur Radio ATV Repeaters 2010**.

2. Repeater **Offsets (splits)** are explained on the map **New Zealand Amateur Radio National System 2010**

70 cm: User transmits 5 MHz lower for 438.xxx and 439.xxx. User transmits 5 MHz higher for 433.xxx and 434.xxx. Vertical polarisation.

23 cm: User transmits lower by 7.600 MHz

National System repeaters are listed on their own page



APRS, BULLETIN BOARDS, DIGIPEATERS & D-STAR

Simplex. Vertical polarisation.

| Station Name | Frequency | MED Site Name | Topo50 Map Ref | Branch | Trustee 1 | Trustee 2 |
|-----------------|-----------|-------------------|----------------|--------|-----------|------------------|
| Western Suburbs | 144.5750 | WHAU BRIDGE | BA31 508 136 | O3 | ZL1VRR | ZL1RCA |
| Whitford | 144.5750 | WHITFORD | BB32 794 088 | 66 | ZL1WTT | ZL1VFO |
| Taupo | 144.5750 | MAROANUI | BF36 634 324 | 60 | ZL1BU | ZL1KU |
| Te Kapua | 144.5750 | TE KAPUA | BG43 242 289 | | ZL2CC | |
| Hawkes Bay | 144.5750 | TARAPONUI | BH38 233 618 | 13 | ZL2AJ | ZL2DW |
| Manawatu | 144.5750 | PAHIATUA TRACK | BM35 316 240 | 20 | ZL2FX | ZL2MAX |
| Forest Lakes | 144.5750 | FOREST LAKES RD | BN33 847 884 | | ZL2KG | ZL4SJ |
| Nelson | 144.5750 | TAKAKA HILL | BP25 883 586 | 26 | ZL2BCA | ZL2RP |
| Wairarapa | 144.5750 | PARIWHARIKI TRIG | BP35 289 460 | 46 | ZL2BA | ZL4JS |
| Nelson | 144.5750 | FRINGED HILL | BQ26 266 269 | 26 | ZL2BCA | ZL2RP |
| Murchison | 144.5750 | MT MURCHISON | BR23 583 801 | 26 | ZL2BCA | ZL2RP |
| Marlborough | 144.5750 | JAMIES KNOB | BR29 926 969 | 22 | ZL2BK | ZL2WD |
| Kaikoura | 144.5750 | KAIKOURA | BT27 573 033 | 22 | ZL2BK | ZL2WD |
| Christchurch | 144.5750 | MARLEYS HILL | BX24 701 716 | O5 | | N |
| Timaru | 144.5750 | MT HORRIBLE | CA19 460 818 | 34 | ZL3GL | ZL3OZ |
| North Shore | 144.6000 | NORTH SHORE CD HQ | BA31 555 317 | 29 | ZL1AUW | ZL1TGC |
| Tauranga | 144.6250 | MINDEN AMATEUR | BD36 692 218 | 39 | ZL1KRH | |
| Te Puke | 144.6250 | TOTARA STREET | BD37 810 218 | 53 | ZL1MOF | |
| Hamilton | 144.6500 | SEDDON ROAD | BD33 006 165 | 12 | ZL1PK | ZL1GWP |
| Waitomo | 144.6500 | RANGITOTO | BF34 110 510 | 81 | ZL1GWP | ZL1AMW |
| Gisborne | 144.6500 | WHAKAPUNAKE | BH42 992 917 | 11 | ZL2TRG | ZL2HC |
| Kapiti | 144.6500 | MT FIELD | BP32 775 757 | 69 | ZL2GO | ZL4VV |
| Greymouth | 144.6500 | PAPAROA | BT19 636 039 | 49 | ZL3TY | ZL3ADH |
| Timaru | 144.6500 | MT STUDHOLME | CA18 353 531 | 34 | ZL3GL | ZL3OZ |
| Queenstown | 144.6500 | REMARKABLES | CC11 694 014 | 75 | ZL4JW | |
| Dunedin | 144.6500 | MACANDREW RD | CE17 060 143 | 30 | ZL4JH | ZL4GR |
| Dunedin | 144.6500 | HIGHCLIFF | CE17 133 163 | 30 | ZL4JH | ZL4GR |
| Gore | 144.6500 | MILLANE ROAD | CF12 916 860 | O8 | ZL4TCS | ZL4GL |
| Innes Road | 144.7000 | INNES ROAD | BX24 710 838 | | ZL3BCC | |
| North Shore | 432.6500 | NORTH SHORE CD HQ | BA31 555 317 | 29 | ZL1AUW | ZL1TGC |
| North Shore | 438.3000 | NORTH SHORE CD HQ | BA31 555 317 | 29 | ZL1AUW | ZL1TGC |
| Auckland | 439.5750 | MUSICK POINT | BA32 696 201 | 86 | ZL1WOT | ZL1BFB D-STAR DV |
| Auckland | 1293.6250 | MUSICK POINT | BA32 696 201 | 86 | ZL1WOT | ZL1BFB D-STAR DV |
| Auckland | 1294.6250 | MUSICK POINT | BA32 696 201 | 86 | ZL1WOT | ZL1BFB D-STAR DD |

DATA (AND VOICE) REPEATERS

Duplex with normal input/output split. Vertical polarisation.

| Station Name | Frequency | MED Site Name | Topo50 Map Ref | Branch | Trustee 1 | Trustee 2 |
|---------------------------------|-----------|---------------|----------------|--------|-----------|--------------|
| Kapiti Voice and Data 535 | 145.3500 | MT FIELD | BP32 775 757 | 69 | ZL2GO | ZL4VV |
| Kaimai Data 540 | 145.4000 | TAKAURUNGA | BD36 583 034 | 81 | ZL1TAT | ZL1THG |
| Whangarei Data 5425 | 145.4250 | PARAHAKI | AX30 211 471 | 28 | | N |
| Climie Data 5425 | 145.4250 | MT CLIMIE | BP33 801 431 | 63 | ZL2HM | ZL2BRG |
| Auckland Data 5625 | 145.6250 | KLONDYKE ROAD | BC32 602 642 | 66 | ZL1TGC | ZL1BK |
| Tararua Voice & Data 5625 | 145.6250 | MT BUTTERS | BN36 572 057 | O6 | ZL2KA | ZL2KG LINKED |
| Hawkins Hill Data 6625 | 146.6250 | HAWKINS HILL | BQ31 450 237 | 74 | ZL3TC | ZL2TVM |
| Colonial Knob Voice & Data 7075 | 147.0750 | COLONIAL KNOB | BP31 513 426 | 74 | ZL3TC | ZL4JY |
| Wharite Voice & Data 960 | 439.6000 | WHARITE | BM35 431 399 | O6 | ZL2KA | ZL2KG LINKED |

AMATEUR TELEVISION REPEATERS

| Station Name | Frequency | MED Site Name | Topo50 Map Ref | Branch | Trustee 1 | Trustee 2 |
|--------------|-----------|-----------------|----------------|--------|-----------|-----------|
| Ngaio | 431.2500 | NGAIO RESERVOIR | BQ31 494 316 | 74 | ZL2HD | ZL2TAR |
| Whitford | 1248.0000 | WHITFORD | BB32 794 088 | 66 | ZL1WTT | ZL1QF |
| Oamaru | 1282.0000 | CAPE WANBROW | CC18 405 023 | 64 | ZL4DB | ZL4SN |

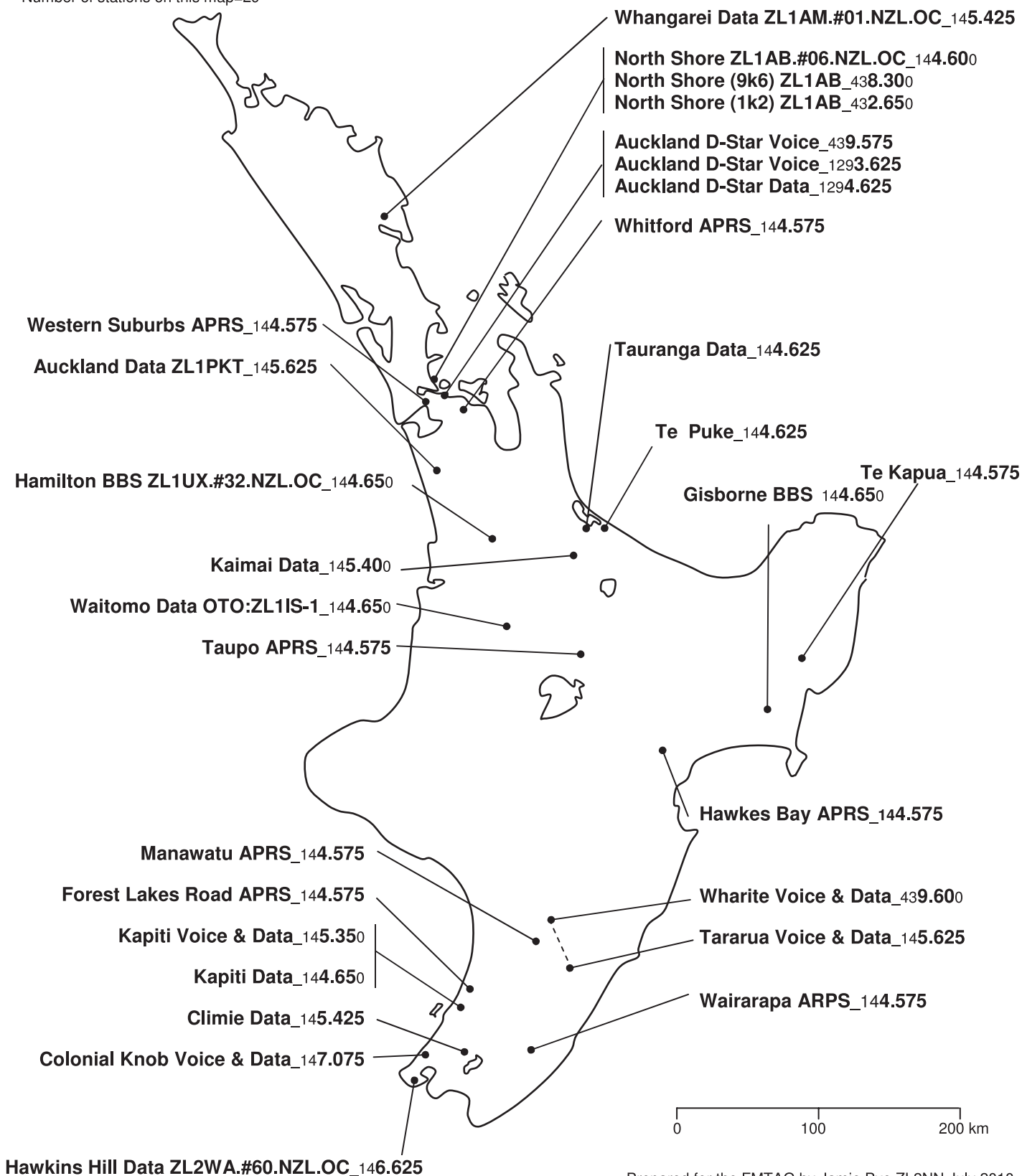
NOTE:

The MED has cancelled all of the Channel 39 Radio Licences and requires operators to apply for Spectrum Licences.

North Island APRS, BBS, Data (& Voice), Digipeaters 2010

NOTE 1. The **naming system** is explained on the map **New Zealand Amateur Radio ATV Repeaters 2010**.
2. Repeater Offsets (splits) are explained on the map **New Zealand Amateur Radio National System 2010**

Number of stations on this map=29

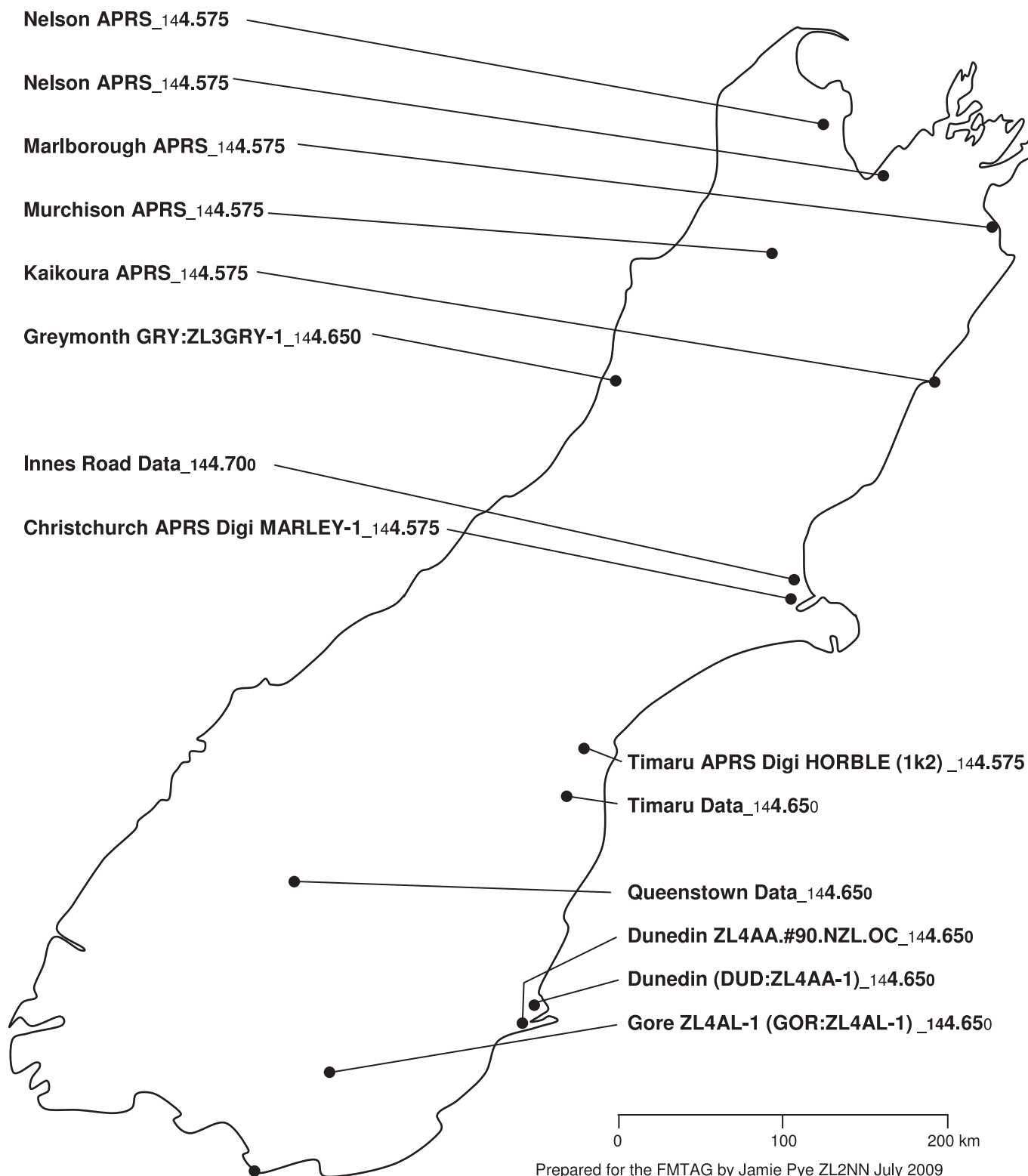


Prepared for the FMTAG by Jamie Pye ZL2NN July 2010
 Corrections, updates and suggestions to: zl2nn@nzart.org.nz
 Download from <http://www.nzart.org.nz/maps/2010/d1-ni.pdf>
 Get station list from <http://www.nzart.org.nz/maps/2010/d1-ni.txt>

South Island APRS, BBS, Data (& Voice), Digipeaters 2010

NOTE 1. The naming system is explained on the map for **New Zealand Amateur Radio ATV Repeaters 2010**.
2. Repeater Offsets (splits) are explained on the map for **New Zealand Amateur Radio National System 2010**

Number of stations on this map=14



Prepared for the FMTAG by Jamie Pye ZL2NN July 2009
Corrections, updates and suggestions to: zl2nn@nzart.org.nz
Download or view from <http://www.nzart.org.nz/maps/2010/d1-si.pdf>
Get station list from <http://www.nzart.org.nz/maps/2010/d1-si.txt>

New Zealand Amateur Radio ATV Repeaters 2010

NOTE 1. Repeater Offsets (splits) are explained on the map **New Zealand Amateur Radio National System 2010**
2. The MED has cancelled all of the Channel 39 Radio Licences and requires operators to apply for Spectrum Licences.

Number of stations on this map=3

Naming of Repeaters and Beacons

The repeaters name is split into two parts: The name (this is normally named after the repeater's location) and the frequency of transmission. The frequency is also split into two parts: an abbreviated version and the full transmit frequency in MHz.

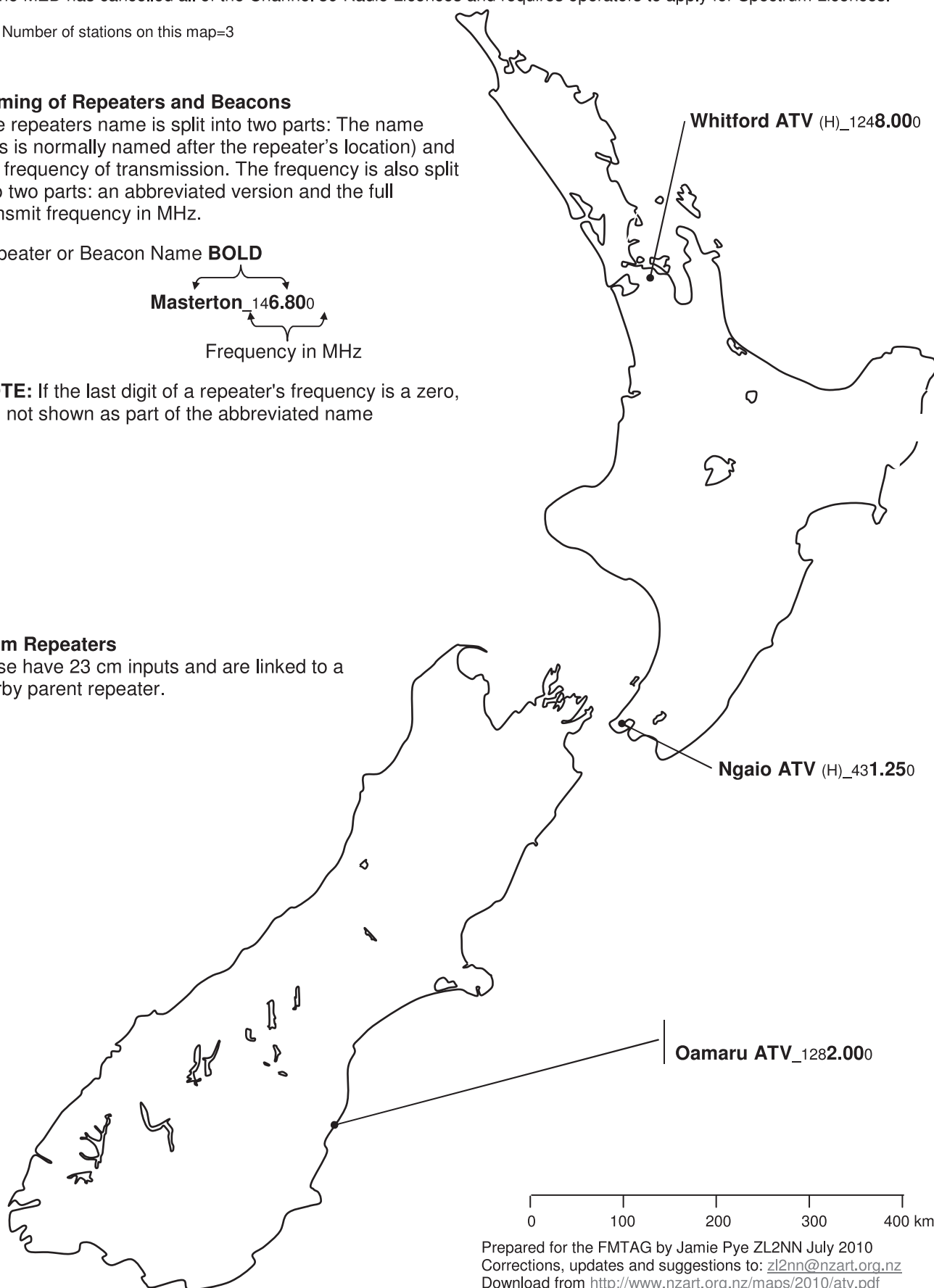
Repeater or Beacon Name **BOLD**

Masterton _{146.800}
Frequency in MHz

NOTE: If the last digit of a repeater's frequency is a zero, it is not shown as part of the abbreviated name

32 cm Repeaters

These have 23 cm inputs and are linked to a nearby parent repeater.



NATIONAL SYSTEM REPEATERS

User transmits 5 MHz high to a repeater having an output frequency of 434.xxx MHz. Vertical polarisation.

User transmits 5 MHz low to a repeater having an output frequency of 439.xxx MHz. Vertical polarisation.

| Station Name | Frequency | MED Site Name | Topo50 Map Ref | Branch | Trustee 1 | Trustee 2 |
|---------------------|-----------|------------------|----------------|--------|-----------|-----------|
| Kaimai 485 | 434.8500 | TAKAURUNGA | BD36 582 034 | 81 | ZL1GWP | ZL3GR |
| Mt Erin 485 | 434.8500 | MT ERIN | BK39 291 940 | 25 | ZL2TC | ZL2DW |
| Blue Duck 485 | 434.8500 | BLUE DUCK | BT28 653 275 | 05 | | N |
| Balclutha 485 | 434.8500 | MT STUART | CF15 504 924 | 35 | ZL4AS | ZL4TL |
| Doubtless Bay 490 | 434.9000 | RANGIAWHIA | AU26 357 416 | 78 | | N |
| Egmont 490 | 434.9000 | MT EGMONT | BJ29 935 505 | 74 | ZL2KG | ZL4JY |
| Waitaki 490 | 434.9000 | MT STUDHOLME | CA18 353 531 | 34 | ZL3GL | ZL3OZ |
| Brynderwyn 495 | 434.9500 | PILBROW HILL | AY30 277 076 | 28 | | N |
| Wairarapa 495 | 434.9500 | PARIWHARIKI TRIG | BP35 289 460 | 46 | ZL2BA | ZL4JS |
| Murchison 495 | 434.9500 | MT MURCHISON | BR23 583 801 | 26 | ZL2BCA | ZL2RP |
| Taupo 9825 | 439.8250 | MAROANUI | BF36 634 324 | 74 | ZL1BU | ZL2KG |
| Auckland 9875 | 439.8750 | KLONDYKE ROAD | BC32 602 642 | 66 | ZL1TGC | ZL1BK |
| Gisborne 9875 | 439.8750 | WHAKAPUNAKE | BH42 992 917 | 11 | ZL2TRG | ZL2HC |
| Wanganui 9875 | 439.8750 | LANDGUARD | BL32 730 750 | 48 | ZL2AN | ZL1BNB |
| Belmont 9875 | 439.8750 | MT BELMONT | BQ32 569 399 | 74 | ZL3TC | ZL2TVM |
| Greymouth 9875 | 439.8750 | SEWELL PEAK | BT19 636 036 | 49 | ZL3ADH | ZL3TY |
| Christchurch 9875 | 439.8750 | MARLEYS HILL | BX24 704 714 | 05 | | N |
| Whangarei 9925 | 439.9250 | PARAHAKI | AX30 211 471 | 28 | | N |
| Rotorua 9925 | 439.9250 | WHAKAPOUNGAU | BE37 979 784 | 33 | ZL1PJ | ZL1BWC |
| Rangitoto | 439.9250 | RANGITOTO | BF34 110 510 | 55 | ZL4SQ | ZL1HJ |
| Kapiti 9925 | 439.9250 | MT FIELD | BP32 775 757 | 69 | ZL2GO | ZL4VV |
| Nelson 9925 | 439.9250 | GRAMPIANS | BQ26 234 283 | 26 | ZL2BCA | ZL2RP |
| Dunedin 9925 | 439.9250 | MT CARGILL | CE17 101 239 | 30 | ZL4JH | ZL4GR |
| Bay of Islands 9975 | 439.9750 | MANGINANGINA | AV28 734 034 | 84 | ZL1IU | ZL1RS |
| Hamilton 9975 | 439.9750 | HAMILTON | BD33 027 103 | 81 | ZL1TAT | ZL1THG |
| Edgumbe 9975 | 439.9750 | MT EDGEUMBE | BE39 277 759 | 67 | ZL1CAY | ZL1OW |
| Wharite 9975 | 439.9750 | WHARITE | BM35 429 399 | 74 | ZL2KG | ZL3TC |

BEACONS

| Callsign | Station Name | Frequency | MED Site Name | Topo50 Map Ref | Branch | Trustee 1 | Trustee 2 |
|----------|--------------------|------------|----------------|----------------|--------|-----------|-----------|
| ZL6B | IBP, NCDX | 14.1000 | GLADSTONE ROAD | BP34 181 532 | 46 | ZL2FC | |
| ZL6B | IBP, NCDX | 18.1100 | GLADSTONE ROAD | BP34 181 532 | 46 | ZL2FC | |
| ZL6B | IBP, NCDX | 21.1500 | GLADSTONE ROAD | BP34 181 532 | 46 | ZL2FC | |
| ZL6B | IBP, NCDX | 24.9300 | GLADSTONE ROAD | BP34 181 532 | 46 | ZL2FC | |
| ZL6B | IBP, NCDX | 28.2000 | GLADSTONE ROAD | BP34 181 532 | 46 | ZL2FC | |
| | Upper Hutt 10 m | 28.2290 | MT CLIMIE | BP33 801 431 | 63 | ZL2HM | ZL2BRG |
| ZL3MHB | Gtrey mouth 6 m | 50.0525 | GREYMOOUTH | BT19 532 986 | 49 | ZL3TY | ZL3ADH |
| ZL2MHB | Hawkes Bay 6 m | 51.0300 | LATHAM ST | BK39 354 197 | 25 | ZL2TC | ZL2DW |
| | Upper Hutt 6 m | 52.2750 | MT CLIMIE | BP33 801 431 | 63 | ZL2HM | ZL2BRG |
| ZL2SIX | Blenheim 6 m | 52.4900 | WITHER HILLS | BR28 821 999 | 22 | ZL2BK | ZL2WD |
| | Auckland 2 m | 144.2530 | NIHOTUPU | BA31 402 115 | 66 | ZL1QF | ZL1WTT |
| ZL1VHW | Waikato 2 m | 144.2560 | HAMILTON CITY | BD33 006 165 | 81 | ZL1THG | ZL1UJG |
| | Hawkins Hill 2 m | 144.2750 | HAWKINS HILL | BQ31 450 237 | 74 | ZL3TC | ZL2TVM |
| ZL3VHF | Christchurch 2 m | 144.2850 | GALBRAITH AVE | BX24 732 818 | 05 | | N |
| | Hokitika 2 m | 144.2860 | HOKITIKA | BU18 327 684 | 49 | ZL3TY | ZL3ADH |
| ZL2VHT | New Plymouth 2 m | 145.2250 | OTARAOA ROAD | BH30 132 751 | 27 | ZL2BR | ZL2BZH |
| ZL2MHB | Hawkes Bay 2 m | 145.2400 | LATHAM ST | BK39 354 197 | 25 | ZL2TC | ZL2DW |
| | Auckland 70 cm | 432.2530 | NIHOTUPU | BA31 402 115 | 66 | ZL1QF | ZL1WTT |
| ZL1VHW | Waikato 70 cm | 432.2560 | HAMILTON CITY | BD33 006 165 | 81 | ZL1THG | ZL1UJG |
| | Hawkins Hill 70 cm | 432.2750 | HAWKINS HILL | BQ31 450 237 | 74 | ZL3TC | ZL2TVM |
| ZL3UHF | Christchurch 70 cm | 432.2850 | GALBRAITH AVE | BX24 732 818 | 05 | | N |
| ZL2VHT | New Plymouth 70 cm | 433.2250 | OTARAOA ROAD | BH30 132 751 | 27 | ZL2BR | ZL2BZH |
| ZL2UHF | Lower Hutt 32 cm | 925.2750 | LOWER HUTT | BQ32 576 362 | 74 | ZL2TAR | ZL2TAK |
| ZL1VHW | Waikato 23 cm | 1296.2560 | HAMILTON CITY | BD33 006 165 | 81 | ZL1THG | ZL1UJG |
| | Hawkins Hill 23 cm | 1296.2750 | HAWKINS HILL | BQ31 450 237 | 74 | ZL3TC | ZL2TVM |
| ZL2UHV | Lower Hutt 12 cm | 2402.2750 | BIRCH ST | BQ32 611 359 | 18 | ZL2TVM | ZL2TWS |
| | Waikato 12 cm | 2424.2600 | TAKAURUNGA | BD36 582 034 | 81 | ZL1THG | ZL1UJG |
| ZL1SHF | Muriwai 5 cm | 5765.0000 | MURIWAI | BA30 288 209 | 74 | ZL1TBG | ZL1AVZ |
| ZL2UHF | Hawkins Hill 3 cm | 10250.0000 | HAWKINS HILL | BQ31 450 237 | 74 | ZL3TC | ZL2TVM |
| ZL2SHF | Hawkins Hill 12 mm | 24150.0000 | HAWKINS HILL | BQ31 450 237 | 74 | ZL3TC | ZL2TVM |

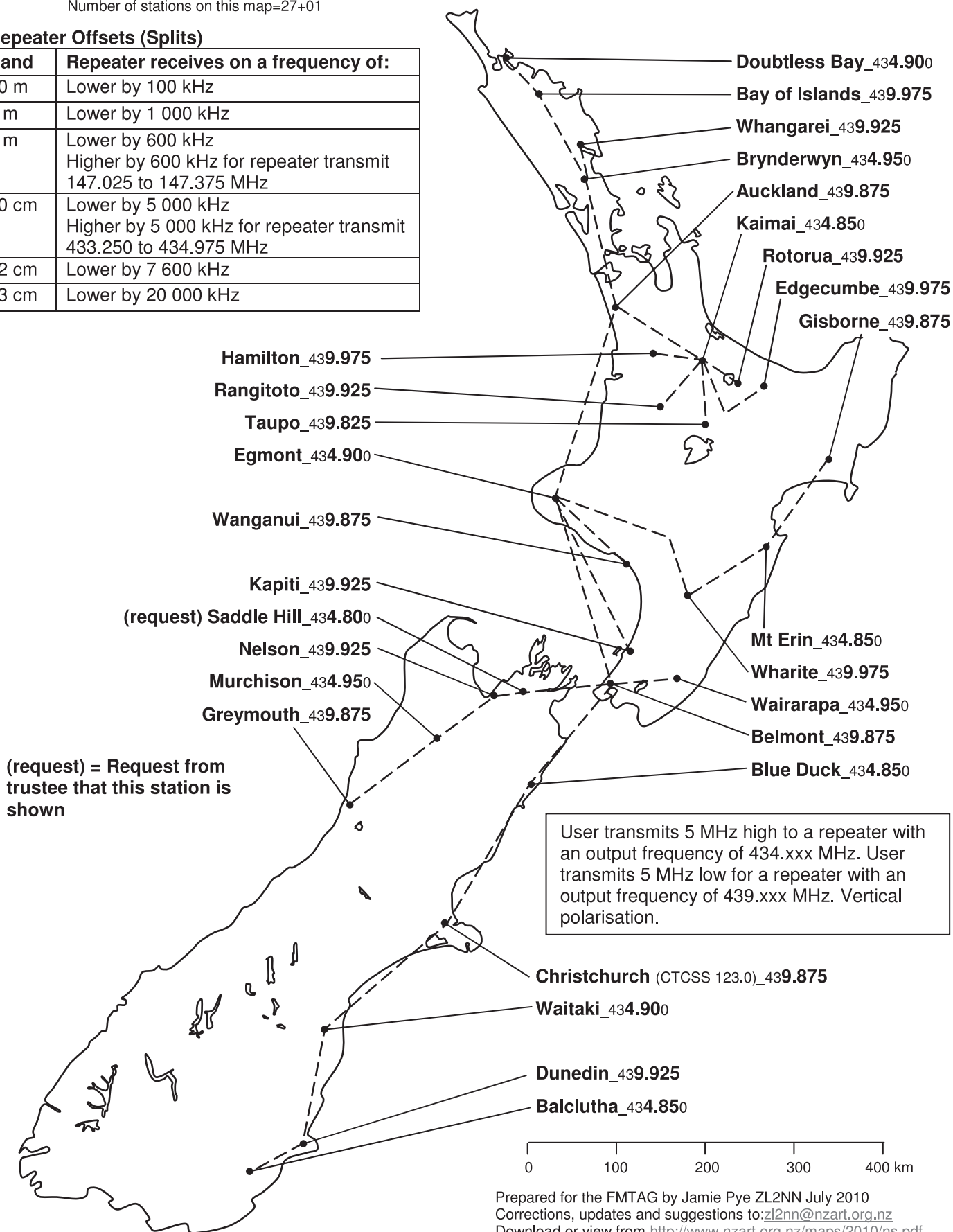
New Zealand Amateur Radio National System 2010

NOTE 1. The **naming system** is explained on the map for **New Zealand Amateur Radio ATV Repeaters 2010**

Number of stations on this map=27+01

Repeater Offsets (Splits)

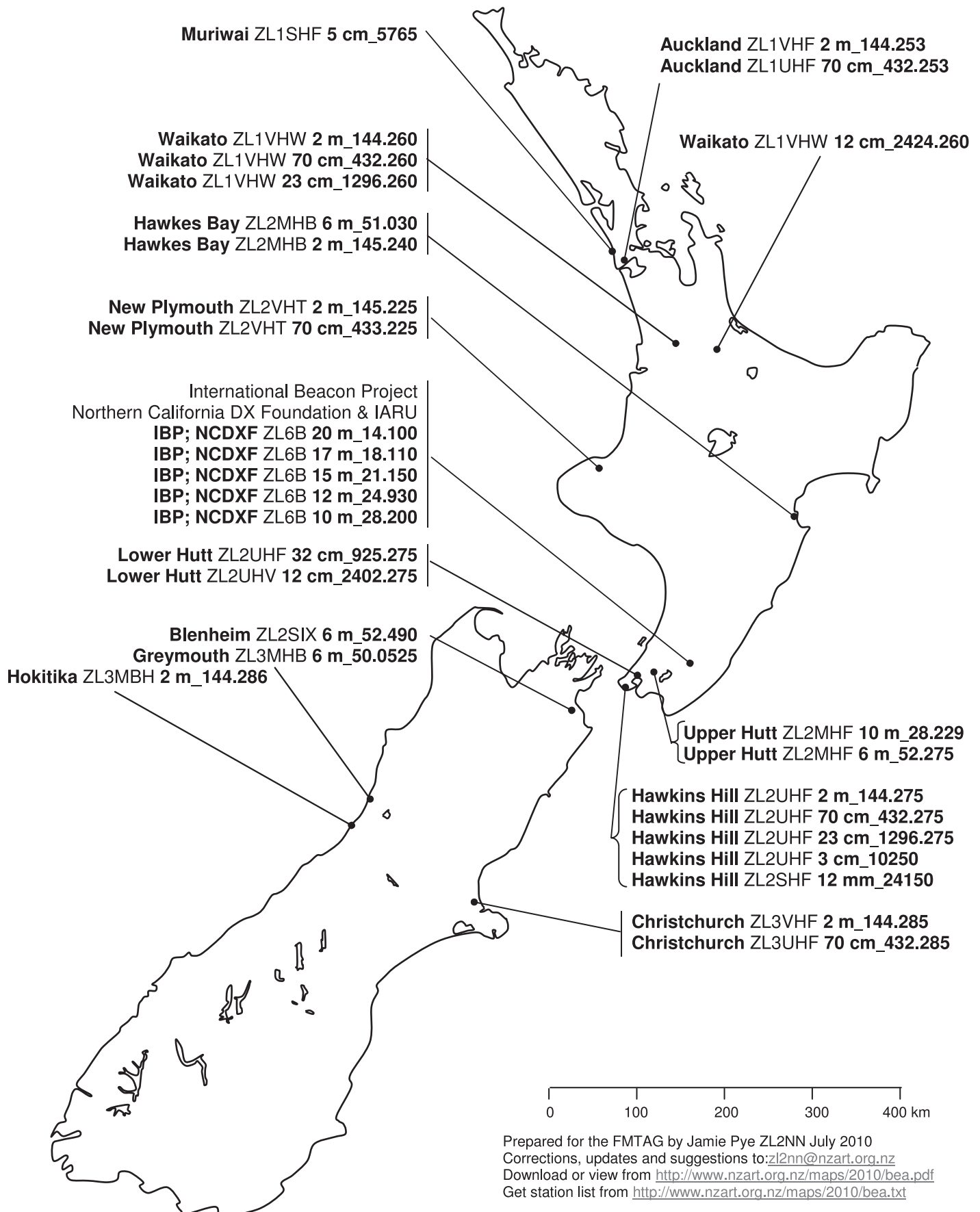
| Band | Repeater receives on a frequency of: |
|-------|---|
| 10 m | Lower by 100 kHz |
| 6 m | Lower by 1 000 kHz |
| 2 m | Lower by 600 kHz Higher by 600 kHz for repeater transmit 147.025 to 147.375 MHz |
| 70 cm | Lower by 5 000 kHz Higher by 5 000 kHz for repeater transmit 433.250 to 434.975 MHz |
| 32 cm | Lower by 7 600 kHz |
| 23 cm | Lower by 20 000 kHz |



New Zealand Amateur Radio Beacons 2010

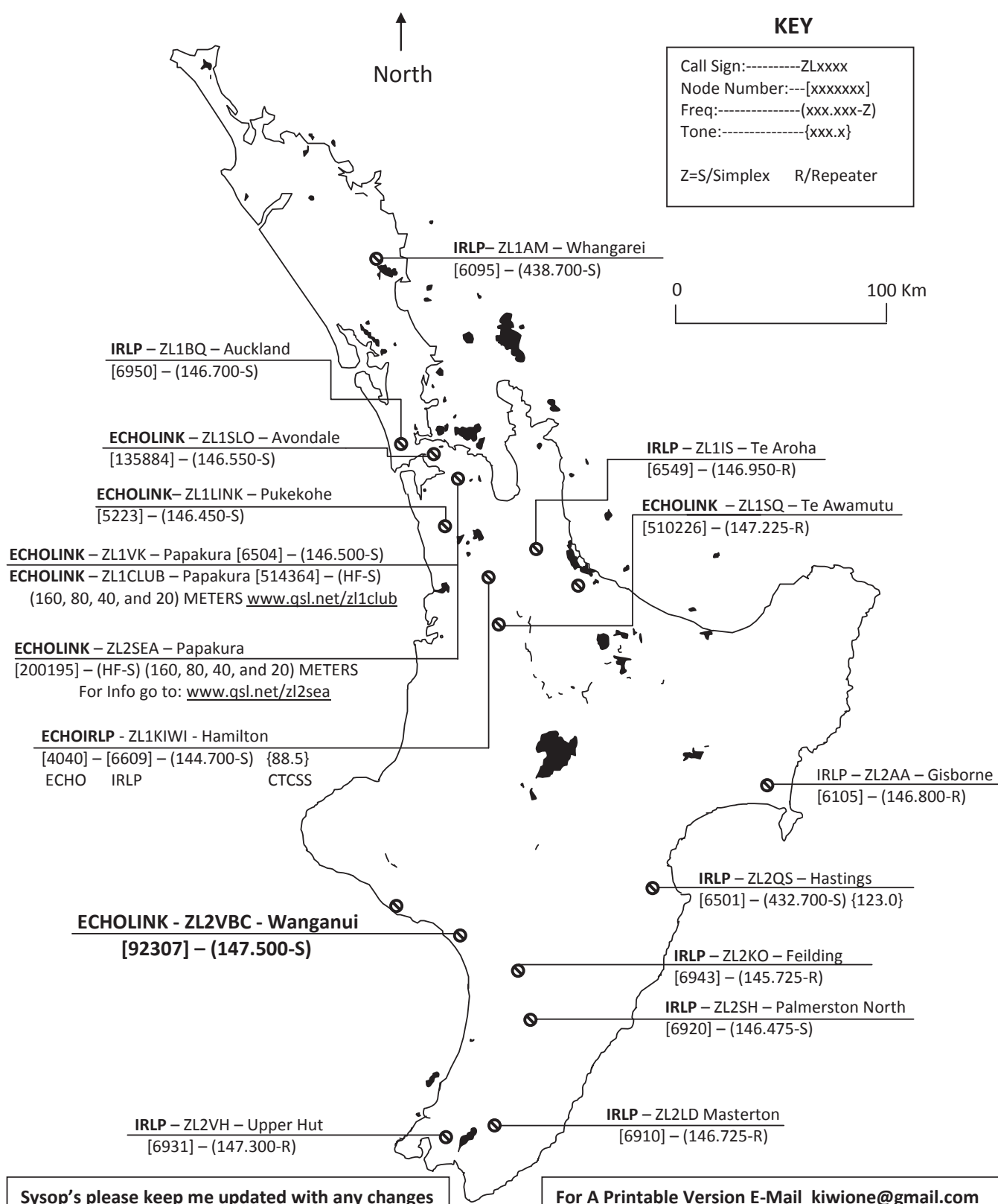
Number of stations on this map=30

Frequencies are in MHz



The option for printing is remove because I get very little feed back or updates to enable me to keep the maps updated.
Maybe this will encourage people to contact me.

New Zealand Amateur Radio VoIP Systems



Prepared By Cyril Rosewarne ZL2VBC Sept 2010

<http://homepages.xnet.co.nz/~rosvonne/EcholinkWebpage/echolink.html>

North Island Link

South Island Link

The option for printing is remove because I get very little feed back or updates to enable me to keep the maps updated.
Maybe this will encourage people to contact me.

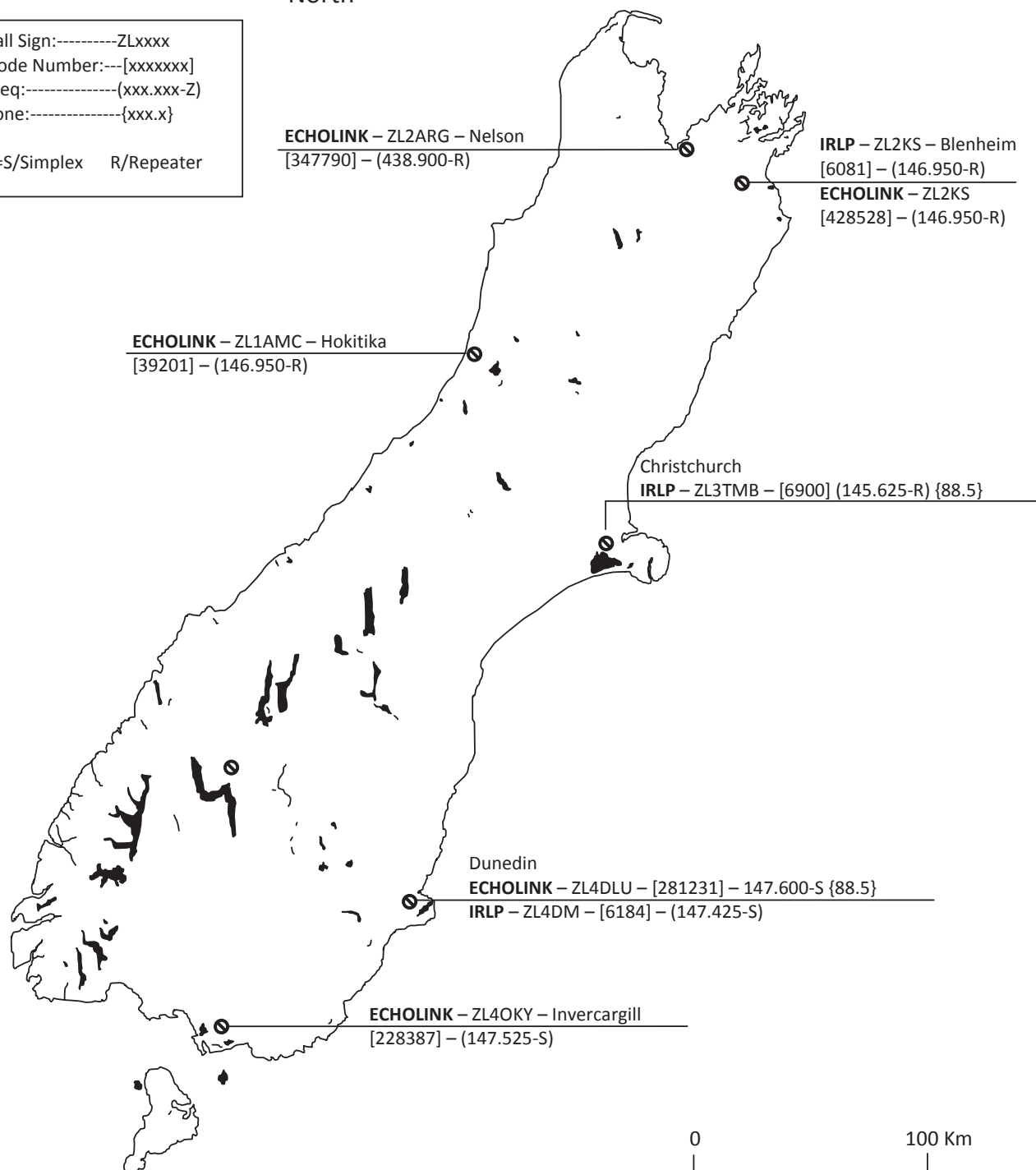
New Zealand Amateur Radio VoIP Systems

KEY

Call Sign:-----ZLxxxx
Node Number:---[xxxxxxx]
Freq:-----{xxx.xxx-Z}
Tone:-----{xxx.x}

Z=S/Simplex R/Repeater

↑
North



REPEATERS & BEACONS

Sysop's please keep me updated with any changes

For A Printable Version E-Mail kiwione@gmail.com

Prepared By Cyril Rosewarne ZL2VBC June 2010

<http://homepages.xnet.co.nz/~rosvonne/EcholinkWebpage/echolink.html>

North Island Link

South Island Link

SHORT TERM SPECIAL PURPOSE (STSP) REPEATERS

Most Branches have cancelled their individual STSP Licences, and are now taking advantage of MED Licence 209732.

CONDITIONS OF LICENCE 209732:

Transmit Frequencies: 146.675, 146.725, 146.825, 146.875, 146.925, 438.625, 438.675, 438.725, 438.750, 438.775 MHz.

Standard input/output frequency offsets.

17 dBW (50 Watts) maximum e.i.p.

STSP repeaters must not cause interference to other licensed services.

Only STSP repeaters are permitted under this licence.

The maximum permitted operating duration is 14 days.

The minimum inter-antenna spacing, between the STSP repeater antenna and the antenna of any other communications service, is 50 metres; otherwise ALL NEW ZEALAND.

The following Branches have retained their individual STSP Licences:

| Frequency | Location | Topo50 Map Ref | Branch | Trustee 1 | Trustee 2 | Note |
|-----------|---------------|----------------|--------|-----------|-----------|------|
| 145.3250 | SEDDON ROAD | BD33 006 165 | 12 | ZL1PK | ZL1GWP | |
| 146.9250 | BLLENHEIM | BQ28 759 086 | 22 | ZL2BK | ZL2WD | |
| 147.2750 | CHRISTCHURCH | BY21 005 386 | 05 | | | N |
| 438.6250 | DODSON VALLEY | BQ26 270 345 | 26 | ZL2BCA | ZL2RP | |

SIMPLEX AND CALLING FREQUENCIES

| | |
|--------------------|--|
| 144.100 | Oceania SSB Calling |
| 144.200 | NZ SSB Calling |
| 144.500 | FM Calling |
| 144.550 | Narrow digital mode simplex of up to 16 kHz bandwidth |
| 144.575 | Data Simplex and APRS |
| 144.600 | Primary data/packet port linked to Digital National System |
| 144.625 | Secondary data/packet port linked to Digital National System |
| 144.650 | Primary local data/packet store/forward |
| 144.675 | Secondary local data/packet store/forward |
| 144.700 | Voice-over Internet Simplex |
| 145.250 | Narrow band picture modes: FAX, Hellschreiber, SSTV, etc. |
| 146.425 to 146.600 | FM Simplex |
| 147.400 to 147.475 | FM Simplex |
| 147.500 | Tertiary local data/packet store/forward |
| 147.525 to 147.600 | FM Simplex |
| 432.200 | SSB Calling |
| 432.500 | FM Calling |
| 432.550 | Narrow digital mode simplex of up to 16 kHz bandwidth |
| 432.575 | Data Simplex and APRS |
| 432.600 | Primary data/packet port linked to Digital National System |
| 432.625 | Secondary data/packet port linked to Digital National System |
| 432.650 | Primary local data/packet store/forward |
| 432.675 | Secondary local data/packet store/forward |
| 432.700 | Voice-over Internet Simplex |
| 438.300 | Tertiary local data/packet store/forward |
| 1294.125 | Wide digital mode simplex of up to 250 kHz bandwidth |

Above 432 MHz use the following as a guide to designated frequencies:

F to F+1 MHz for standard narrow band or weak signal segment, Where F = 432, 621, 925, 1296, 2424, 3399, 5760, 10368, 24192, 47088, 80640 MHz.

| | |
|------------------|--|
| F+0.200 | SSB Calling |
| F+0.250 to 0.300 | Beacons (geographic plan, 1 kHz spacing) |
| F+0.500 | FM Calling |
| F+0.550 | Narrow digital mode simplex of up to 16 kHz bandwidth |
| F+0.575 | Data Simplex and APRS |
| F+0.600 | Primary data/packet port linked to Digital National System |
| F+0.625 | Secondary data/packet port linked to Digital National System |
| F+0.650 | Primary local data/packet store/forward |
| F+0.675 | Secondary local data/packet store/forward |
| F+0.700 | Voice-over Internet Simplex |

NCDXF/IARU INTERNATIONAL BEACON NETWORK



The NCDXF, in co-operation with the IARU, constructed and operates a worldwide network of high-frequency radio beacons on 14.100, 18.110, 21.150, 24.930 and 28.288MHz. These beacons help both amateur and commercial high-frequency radio users assess the current condition of the ionosphere. The entire system is designed, built and operated by volunteers at no cost except the actual price of hardware components, shipping costs, and so on.

In principle, one can simply listen on the beacon frequencies and copy the CW call-signs of the various beacons to figure out where the band is open, but in practice, not every ham operator can copy calls at twenty-two words per minute and some beacons may be heard at too low a signal strength to catch the call. Because the beacons transmit at known times, it is easy to know which beacon one is hearing without actually copying the CW call-sign. Since the beacons are running 100W to a vertical, even a weak beacon signal may indicate a path with excellent propagation for stations using higher power and directive antennas.

For the latest information see the NCDXF website at <http://www.ncdxf.org/beacons.html>.

Table 1. NCDXF/IARU Beacon Transmission Schedule

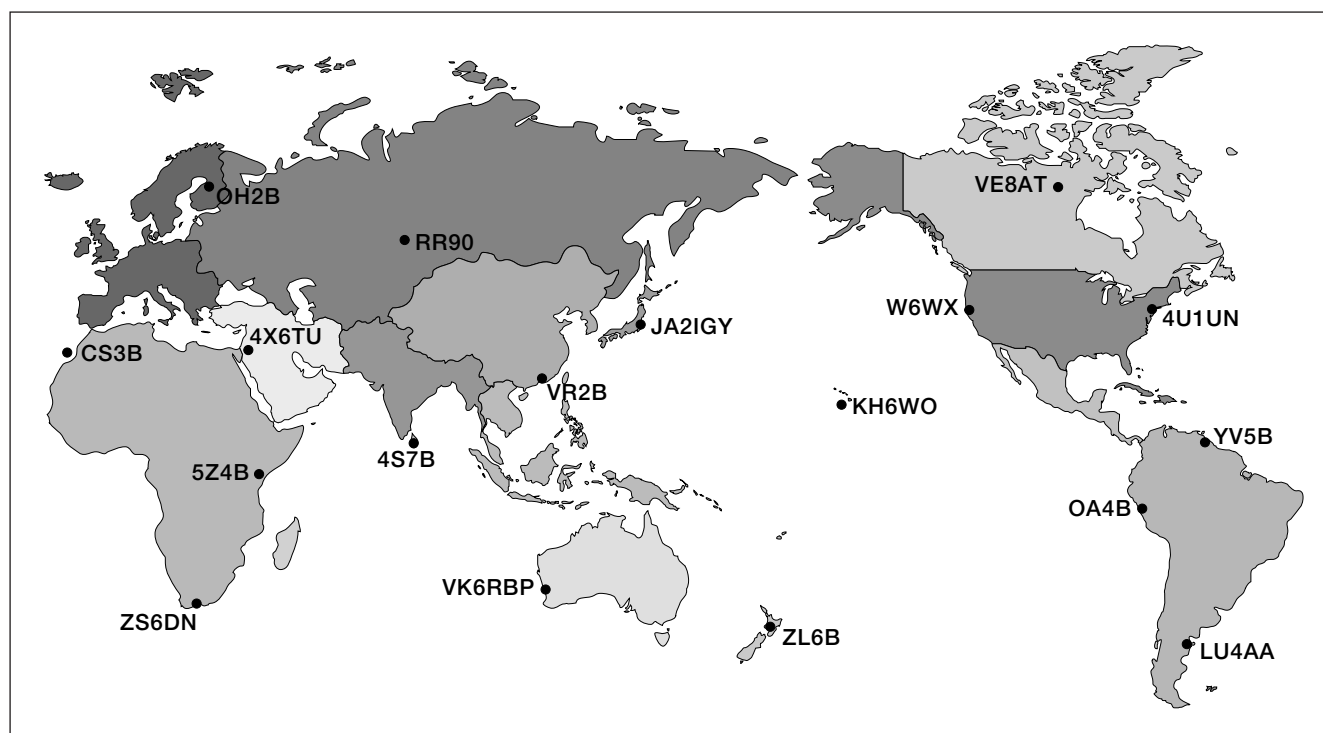
As at August 2010.

This table gives the minute and second within each hour of the start of the first transmission of each of beacon on each frequency. Each transmission is repeated every three minutes. A transmission consists of the call-sign of the beacon sent at 22 words per minute followed by four one-second dashes. The call-sign and the first dash are sent at 100 watts. The remaining dashes are sent at 10 watts, 1 watt and 0.1 watts.

| Slot | Country | Call | 14.100 | 18.110 | 21.150 | 24.930 | 28.200 | Operator |
|------|----------------|--------|--------|--------|--------|--------|--------|----------|
| 1 | United Nations | 4U1UN | 00:00 | 00:10 | 00:20 | 00:30 | 00:40 | UNRC |
| 2 | Canada | VE8AT | 00:10 | 00:20 | 00:30 | 00:40 | 00:50 | RAC/NARC |
| 3 | United States | W6WX | 00:20 | 00:30 | 00:40 | 00:50 | 01:00 | NCDXF |
| 4 | Hawaii | KH6WO | 00:30 | 00:40 | 00:50 | 01:00 | 01:10 | KH6BYU |
| 5 | New Zealand | ZL6B | 00:40 | 00:50 | 01:00 | 01:10 | 01:20 | NZART |
| 6 | Australia | VK6RBP | 00:50 | 01:00 | 01:10 | 01:20 | 01:30 | WIA |
| 7 | Japan | JA2IGY | 01:00 | 01:10 | 01:20 | 01:30 | 01:40 | JARL |
| 8 | Russia | RR90 | 01:10 | 01:20 | 01:30 | 01:40 | 01:50 | SRR |
| 9 | Hong Kong | VR2B | 01:20 | 01:30 | 01:40 | 01:50 | 02:00 | HARTS |
| 10 | Sri Lanka | 4S7B | 01:30 | 01:40 | 01:50 | 02:00 | 02:10 | RSSL |
| 11 | South Africa | ZS6DN | 01:40 | 01:50 | 02:00 | 02:10 | 02:20 | ZS6DN |
| 12 | Kenya | 5Z4B | 01:50 | 02:00 | 02:10 | 02:20 | 02:30 | ARSK |
| 13 | Israel | 4X6TU | 02:00 | 02:10 | 02:20 | 02:30 | 02:40 | IARC |
| 14 | Finland | OH2B | 02:10 | 02:20 | 02:30 | 02:40 | 02:50 | SRAL |
| 15 | Madeira | CS3B | 02:20 | 02:30 | 02:40 | 02:50 | 00:00 | ARRM |
| 16 | Argentina | LU4AA | 02:30 | 02:40 | 02:50 | 00:00 | 00:10 | RCA |
| 17 | Peru | OA4B | 02:40 | 02:50 | 00:00 | 00:10 | 00:20 | RCP |
| 18 | Venezuela | YV5B | 02:50 | 00:00 | 00:10 | 00:20 | 00:30 | RCV |

Table 2. NCDXF/IARU Beacon Locations

| Slot | Country | Call | Location | Latitude | Longitude | Grids |
|------|----------------|--------|-----------------|-----------|------------|--------|
| 1 | United Nations | 4U1UN | New York City | 40° 45' N | 73° 58' W | FN30as |
| 2 | Canada | VE8AT | Eureka, Nunavut | 79° 59' N | 85° 57' W | EQ79ax |
| 3 | United States | W6WX | Mt. Umunhum | 37° 09' N | 121° 54' W | CM97bd |
| 4 | Hawaii | KH6WO | Laie | 21° 38' N | 157° 55' W | BL11ap |
| 5 | New Zealand | ZL6B | Masterson | 41° 03' S | 175° 36' E | RE78tw |
| 6 | Australia | VK6RBP | Rollstone | 32° 06' S | 116° 03' E | OF87av |
| 7 | Japan | JA2IGY | Mt. Asama | 34° 27' N | 136° 47' E | PM84jk |
| 8 | Russia | RR90 | Novosibirsk | 54° 59' N | 82° 54' E | NO14kx |
| 9 | Hong Kong | VR2B | Hong Kong | 22° 16' N | 114° 09' E | OL72bg |
| 10 | Sri Lanka | 4S7B | Colombo | 6° 06' N | 80° 13' E | NJ06cc |
| 11 | South Africa | ZS6DN | Pretoria | 25° 54' S | 28° 16' E | KG44dc |
| 12 | Kenya | 5Z4B | Kariobangi | 1° 15' S | 36° 53' E | KI88ks |
| 13 | Israel | 4X6TU | Tel Aviv | 32° 03' N | 34° 46' E | KM72jb |
| 14 | Finland | OH2B | Lohja | 60° 19' N | 24° 50' E | KP20 |
| 15 | Madeira | CS3B | Santo da Serra | 32° 43' N | 16° 48' W | IM12Or |
| 16 | Argentina | LU4AA | Buenos Aires | 34° 37' S | 58° 21' W | GF05tj |
| 17 | Peru | OA4B | Lima | 12° 04' S | 76° 57' W | FH17mw |
| 18 | Venezuela | YV5B | Caracas | 10° 25' N | 66° 51' W | FK60nj |



Question a gathering of hams, and one will inevitably find that several were once DXers or shortwave listeners before they moved on to join the ranks of amateur radio. Many listeners progress no further than just being listeners, a few becoming serious DXers, but for some the novelty of talking to the world draws them into amateur radio. Those who have progressed through the hobby of DXing have acquired much of the basic radio theory, and are better prepared for the study required for sitting the amateur radio exam.

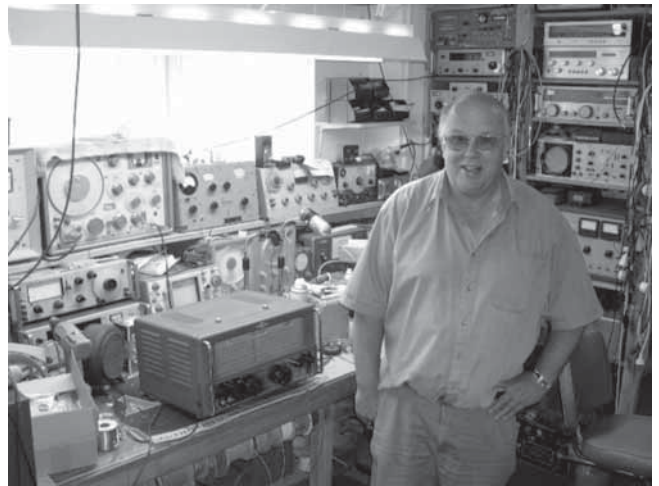
The similarities between the two hobbies are numerous. The bands that DXers monitor range from VLF to VHF. The modes range from AM to FM. With the increasing use of computers, digital reception is gaining interest. However, despite the widening range of options, listening to shortwave broadcasts still remains the most popular activity.

Like amateur radio, the equipment used over the years has changed. Gone are the days when the dual band household radio served as the DX receiver. After the war, DXers used war-surplus radio sets such as the Marconi R1155, ARC5 and Bendix MN26C compass receiver. Gradually, valve communication receivers, such as the Eddystone and Hallicrafters became available and affordable. Today, like the amateur, we are in the digital age, with sophisticated receivers ranging from the small portable SONY 7600G to the ICOM R7x series and the professional NRD545 communications receivers and latterly a variety of Software Defined Radios (SDR) or PC Controlled Radios

(PCR). There has been an increase in the number of small sized, lower priced analogue and digital portable receivers being manufactured under a variety of names so there should be something to suit all budgets. Over the years amateur equipment has developed to an even greater extent, with many hams using multi-functional transceivers which incorporate all-band general coverage reception.

Unlike the amateurs, the antennas used by the DXer over the years have changed little. The fortunate few who have the space to run out a Beverage still chase the elusive medium wave DX. Most persevere with an end-fed wire or a dipole. Those DXers living in high noise suburbia may try and develop low-noise antennas like the EWE or Flag types. Like amateur radio there is great scope for development, but we do tend to lack the technical expertise that the ham fraternity can draw upon. Because of the wide range of shortwave bands, the DXer does have great difficulty designing a multi-band antenna. However, with regard to propagation, I feel that any top DXer can "hold their own" with a ham DXer. Propagation is just as important to both hobbies. We complain about band conditions just as much as the ham down the road.

For many shortwave listeners, the QSLing of reception reports is the whole purpose of it all. But more and more, verification is becoming less important and just hearing the station and programme is the enjoyment. The variety of programmes heard over international broadcasters is far more varied and interesting than that heard on domestic



NZ Radio DX League member Gordon Baker of Tauranga, DXer and collector of communications receivers, with a venerable Eddystone 680X receiver on his radio shack workbench. (2005)

radio. Nevertheless, serious DXing is still the backbone of the hobby, and the thrill of hearing and finally verifying a rare low powered station from some exotic country, is no different than that experienced by an amateur DXer.

DXing in New Zealand is almost as old as amateur radio, with the first DX club being formed in 1931. Although the New Zealand DX Club folded in the late 1940s, two other DX clubs are still active; the New Zealand DX Radio Association, now over 70 years old, and the New Zealand Radio DX League, which celebrated its 60th anniversary in 2008.

Amateur radio, like other hobbies, loses many participants to other pastimes and interests. This loss of interest in some cases may be due to boredom or burnout with the hobby. New horizons and challenges may be needed. We all get stale or frustrated at some time. May it be suggested to those amateurs who feel they need a variation or change, but still retain their interest in wireless, is that they consider shortwave listening? Some hams that entered amateur radio through the hobby of DXing might consider revisiting it. Most hams have an antenna and a rig capable of general coverage reception. It might be worthwhile tuning a bit further than just the ham bands. Start listening to the world of International Shortwave Broadcasting. Both hobbies fit nicely together, as found in Auckland where the Western Suburbs Radio Club allows the Auckland Branch of the New

Zealand Radio DX League to hold its monthly meetings in their clubrooms. In return, Branch 03 has gained several newly licensed hams from the ranks of the DXers. Try listening to a few broadcasts or download a sample of the New Zealand Radio DX League's monthly magazine, the NZ DX TIMES from the New Zealand Radio DX League's own Internet site at <www.radiodx.com>, which is a great starting point for anyone interested in shortwave listening. Information on how to join the NZ Radio DX League and membership options can be found here. I have found that shortwave listening and amateur radio complement each other and have helped maintain my interest in both hobbies for many years.



Peter Grenfell of Oamaru, Life Member of the NZ Radio DX League, DXing with an Icom communications receiver at the League's famous Tiwai (Southland) Listening Post (2003). Other receivers shown - Drake SPR4 and Grundig Satellit.



Bryan Clark, Vice President of the NZ Radio DX League, chasing rare DX whilst mobile with an AOR7030+ communications receiver and ground Beverage antenna (BOG) at Mangawhai Northland (2003)

NEW ZEALAND COASTAL MARITIME RADIO STATIONS

Maritime Radio Service

For seafarers, their main lifeline to land is the ship's radio.

Maritime New Zealand (MNZ) is responsible for maintaining VHF and HF radio services for New Zealand's coastal waters and the South Pacific, providing around-the-clock monitoring of radio frequencies for distress messages. The region covered by the New Zealand distress and radio safety service is known as NAVAREA XIV, covering 12.5% of the earth's ocean surface. It

extends from mid-Tasman to mid-Pacific and from the Antarctica to the Equator.

MNZ is also responsible for the broadcast of Maritime Safety Information (MSI) within the NAVAREA. The MSI includes meteorological information, coastal and oceanic navigational warnings, and ionospheric prediction forecasts.

The service provided by MNZ is complemented by a network of volunteer private radio operators around New Zealand and its

offshore islands.

The radio network is monitored by staff located at the Maritime Operations Centre (MOC) in Lower Hutt on a 24/7 basis.

The Maritime Radio Service consists of 30 coastal VHF stations. Twenty eight of these stations provide VHF radio coverage throughout the coastal waters surrounding New Zealand. The other two stations provide VHF radio coverage in the coastal waters surrounding the Chatham Islands. There is

also an oceanic MF/HF radio station located to the east of Lake Taupo. All the stations are linked to MOC, which is co-located with the Rescue Coordination Centre New Zealand (RCCNZ). MOC co-ordinates the transmission of all MSI over the INMARSAT SafetyNET satellite system, and by voice on HF and VHF.

The scheduled broadcast times, channels and frequencies are detailed below.

TABLES OF SSB FREQUENCIES & VHF CHANNELS

All ships licensed to operate in the marine frequency bands between 1605kHz and 2850kHz must be able to transmit and receive on 2182kHz. Distress, urgency and safety calls should be made on this frequency. The 2182kHz frequency is also the general calling and reply frequency when establishing communication with ship and coastal stations and for use by coastal stations to announce the transmission, on other frequencies, of safety information and lists of messages on hand. Except for distress and urgency, all other communications should be carried out on a working or inter-ship frequency, leaving 2182kHz available for such calls. Safety traffic should also be transmitted on a working frequency.

Local SSB Frequencies In The Medium And High Frequency Bands (Mf/Hf)

| | |
|---|--|
| Supplementary calling frequency. | 2045kHz 2068kHz |
| Inter-ship working frequency for use after communication has been established on 2182kHz or 2045kHz. | 2456kHz 2638kHz 2012kHz |
| Harbour authority working frequency. | 2162kHz |
| Working frequencies for exchanging messages between private coastal stations and ships after communication has been established on 2182kHz or 2045kHz. | 2480kHz 2444kHz |
| For communication with coastal stations providing communication for aquatic sporting events. These frequencies may also be used by land stations providing communication for sporting events. | 2089kHz 2129kHz |
| Working frequencies between coastal and ship stations, or inter-ship, after initial contact has been established on 4125kHz. | 4146kHz 4417kHz |
| Working frequencies between coastal and ship stations, or inter-ship, after initial contact has been established on 6215kHz. | 6224kHz 6227kHz |
| Working frequencies for exchanging messages between TAUPU Maritime Radio and ships after communication has been established on a calling frequency. | 2207kHz 4146kHz 6224kHz 8297kHz 12356kHz 16531kHz |

International Distress And Calling Frequencies In The Medium And High Frequency Bands (MF/HF)

| | |
|---|--------------------|
| An international distress, safety and calling frequency for radiotelephony. | 2182kHz |
| An international distress, safety and calling frequency. | 4125kHz 6215kHz |
| International call frequency only (not monitored by MOC). | 8255kHz |
| International distress and safety frequency only. | 8291kHz |

| | |
|---|----------------------|
| International distress, safety and calling frequencies. | 12290kHz 16420kHz |
|---|----------------------|

| Purpose Of VHF Channels | Channel |
|---|--|
| The international distress, safety and calling frequency for the maritime mobile VHF radiotelephone service. | 16 |
| All ship's stations licensed for operation in the authorised bands between 156MHz and 174MHz must be able to transmit and receive on this channel. | |
| Inter-ship navigation safety. | 13 |
| For inter-ship working. | 6, 8 |
| Working channel for harbour authority radio stations on port operation and ship movements. | 9, 10, 11, 12, 14, 19 |
| Continuous weather transmission channel. | 20, 21, 22, 23 |
| Two frequency talk-through repeater channels, some allocated to Coastguard and to other private coast stations. | 1, 3, 4, 5, 60, 61, 62, 63, 64, 65, 66, 80, 81, 82, 83, 84, 85, 86 |
| Working channel for Great Barrier Maritime Radio. | 25 |
| Working channel for WHANGAREI, TOLAGA, WAIRARAPA, TARANAKI, D'URVILLE, FOX, PUYSEGUR, KAIKOURA and WAITAKI Maritime Radios, and anti-pollution operations. | 67 |
| Working channel for CAPE REINGA, PLENTY, NAPIER, FAREWELL, PICTON, AKAROA, GREYMOUTH and BLUFF Maritime Radios. | 68 |
| Working channel Wanganui Maritime Radio. | 69 |
| DSC distress alert and messaging | 70 |
| Working channels between coast and ship stations after initial contact has been made on channel 16. Also working channel for KAITAIA, AUCKLAND, RUNAWAY, WELLINGTON, WESTPORT, FIORDLAND, CHALMERS, CAPE EGMONT and STEWART ISLAND Maritime Radios. | 71 |
| Channel for use in association with marina developments. | 73 |
| Working channels between coast and ship stations after initial contact has been made on channel 16. | 74 |
| Channels available for aquatic events. | 17, 77 |
| Working channels for CHATHAM ISLANDS Maritime Radio. | 60, 62 |

VHF broadcasts

The following broadcasts are made daily by Maritime Radio. These broadcasts include weather warnings, situation and forecast, and

navigational warnings. All times are in New Zealand local times and include a long range (5-day) outlook. All New Zealand coastal VHF stations transmit forecasts for all weather forecast areas simultaneously.

| Taupo Maritime Radio VHF Voice Broadcasts | |
|---|--|
| Calling | Channel 16 |
| Working | Channel 25, 67, 68, 69, 71 |
| Times | 0133, 0533, 0733, 1033*, 1333, 1733 and 2133. NZST or NZDT |

Local area forecasts and current wind conditions are also broadcast continuously by Coastguard in Auckland, Northland, Whitianga, Wellington, Cook Strait and Nelson using channels 20, 21 or 23. Chatham Island coastal VHF stations transmit weather forecasts simultaneously on working channels 60 and 62 at 0603, 1403, 1803, 2203 (all times are Chatham Islands local time +45minutes ahead of NZ local time).

* The 1033 broadcast includes all warnings in force and reports from coastal stations, but no situation or forecast.

TAUPO Maritime Radio (MF/HF)

The MF/HF (SSB) Maritime Radio Service is provided by TAUPO Maritime Radio, from a site in the middle of the North Island (38° 52'S 176° 26'E).

The calling and working frequencies are shown below. A watch is kept continuously on all calling frequencies.

| Taupo Maritime Radio Voice Frequencies (in kHz) | | | | | | |
|---|------|------|------|------|-------|-------|
| Calling | 2182 | 4125 | 6215 | 8291 | 12290 | 16420 |
| Working | 2207 | 4146 | 6224 | 8297 | 12356 | 16531 |

| Taupo Maritime Radio Digital Selective Calling (Dsc) Frequencies (in kHz) | | | | | |
|---|--------|--------|--------|---------|---------|
| Distress | 4207.5 | 6312.0 | 8414.5 | 12557.0 | 16804.5 |

The IMO introduced Digital Selective Calling (DSC) on MF, HF and VHF maritime radios as part of the GMDSS system. DSC is primarily intended to initiate ship-to-ship, ship-to-shore and shore-to-ship radiotelephone and MF/HF radiotelex calls. DSC calls can also be made to individual stations, groups of stations, or "all stations" in one's radio range. Each DSC-equipped ship, shore station and group is assigned a unique 9-digit Maritime Mobile Service Identity.

MF/HF broadcasts

The following broadcasts are made on MF/HF frequencies from TAUPO Maritime Radio. A preliminary call is made on the calling frequencies shown below and the broadcasts are made on the working frequencies. All times are in New Zealand local times.

| Broadcast Type | Times | | Frequencies kHz | | | |
|--|-------|------|-----------------|-------|---------|-------|
| | | | Calling | | Working | |
| Coastal warnings and bulletins (including Chatham Islands) | 0133 | 0533 | 2182 | | 2207 | |
| | 1333 | 1733 | 4125 | | 4146 | |
| | | | 6215 | | 6224 | |
| Coastal reports | 0803 | | 2182 | | 2207 | |
| | 1203 | | 4125 | | 4146 | |
| | 2003 | | 6215 | | 6224 | |
| Oceanic warnings* | 0303 | 1503 | 6215 | 12290 | 6224 | 12356 |
| Oceanic warnings* | 0333 | 1533 | 8291 | 16420 | 8297 | 16531 |
| Oceanic weather bulletins and warnings | 0903 | 2103 | 6215 | 12290 | 6224 | 12356 |
| Oceanic weather bulletins and warnings | 1003 | 2203 | 8291 | 16420 | 8297 | 16531 |

* For daylight saving time, add 1 hour.

Notes:

- Bulletins contain weather situation and forecast.
- Reports contain the weather situation at selected coastal sites.
- Warnings include navigational, ionospheric and meteorological warnings.

Useful Contacts:

Maritime New Zealand

PO Box 27 006, Wellington

Ph (04) 473 0111

Fax (04) 494 1263

Email

maritime.radio@maritimenz.

govt.nz

Website www.maritimenz.govt.nz

Maritime New Zealand

Maritime Operations Centre

Ph 0800 MARITIME

(0800 627 484)

or (04) 914 8333

Fax (04) 914 8334

Email maritime@kordia.co.nz

INTERNATIONAL VHF MARINE CHANNELS

| Channel | Ship | Coast |
|---------|---------|---------|
| | Tx | Tx |
| 0 | 156 | 160.6 |
| 1 | 156.05 | 160.65 |
| 2 | 156.1 | 160.7 |
| 3 | 156.15 | 160.75 |
| 4 | 156.2 | 160.8 |
| 5 | 156.25 | 160.85 |
| 6 | 156.3 | |
| 7 | 156.35 | 160.95 |
| 8 | 156.4 | |
| 9 | 156.45 | 156.45 |
| 10 | 156.5 | 156.5 |
| 11 | 156.55 | 156.55 |
| 12 | 156.6 | 156.6 |
| 13 | 156.65 | 156.65 |
| 14 | 156.7 | 156.7 |
| 15 | 156.75 | 156.75 |
| 16 | 156.8 | 156.8 |
| 17 | 156.85 | 156.85 |
| 18 | 156.9 | 161.5 |
| 19 | 156.95 | 161.55 |
| 20 | 157 | 161.6 |
| 21 | 157.05 | 161.65 |
| 22 | 157.1 | 161.7 |
| 23 | 157.15 | 161.75 |
| 24 | 157.2 | 161.8 |
| 25 | 157.25 | 161.85 |
| 26 | 157.3 | 161.9 |
| 27 | 157.35 | 161.95 |
| 28 | 157.4 | 162 |
| 60 | 156.025 | 160.625 |
| 61 | 156.075 | 160.675 |

| Channel | Ship | Coast |
|-------------|---------|---------|
| | Tx | Tx |
| 62 | 156.125 | 160.725 |
| 63 | 156.175 | 160.775 |
| 64 | 156.225 | 160.825 |
| 65 | 156.275 | 160.875 |
| 66 | 156.325 | 160.925 |
| 67 | 156.375 | 156.375 |
| 68 | 156.425 | 156.425 |
| 69 | 156.475 | 156.475 |
| 70 | 156.525 | 156.525 |
| 71 | 156.575 | 156.575 |
| 72 | 156.625 | 156.625 |
| 73 | 156.675 | 156.675 |
| 74 | 156.725 | 156.725 |
| 75 | 156.775 | 156.775 |
| 76 | 156.825 | 156.825 |
| 77 | 156.875 | |
| 78 | 156.925 | 161.525 |
| 79 | 156.975 | 161.575 |
| 80 | 157.025 | 161.625 |
| 81 | 157.075 | 161.675 |
| 82 | 157.125 | 161.725 |
| 83 | 157.175 | 161.775 |
| 84 | 157.225 | 161.825 |
| 85 | 157.275 | 161.875 |
| 86 | 157.325 | 161.925 |
| 87 | 157.375 | 157.375 |
| 88 | 157.425 | 157.425 |
| 87B (AIS-1) | 161.975 | 161.975 |
| 88B (AIS-2) | 162.025 | 162.025 |

The Automatic Identification System (AIS) is an automated tracking system used on ships and by Vessel Traffic Services (VTS) for identifying and locating vessels by electronically exchanging data with other nearby ships and VTS stations. AIS information supplements marine radar, which continues to be the primary method of collision avoidance for water transport.

There is software available to track vessels in local waters such as freeais (www.freeais.org), gnuais (<http://gnuais.sourceforge.net/>) or Ship Plotter(<http://www.coaa.co.uk/shipplotter.htm>).

MARITIME RADIO VHF COVERAGE



Note: This map represents approximate location and coverage of Maritime New Zealand's VHF radio stations. From time to time gaps may exist within the areas shown due to terrain shadows and system maintenance. Terrain shadows can occur close to the shore under cliffs or in bays and fiords.

- 24hr/day listening watch is kept by all VHF stations on channel 16.
- The coverage shown above is for vessels with a 25W radio working into a correctly installed antenna mounted 4m or more above the waterline.

NEW ZEALAND RADIO SPECTRUM USAGE

Information Courtesy of Ministry of Economic Development (MED) Radio Spectrum Management Group (RSM)
Refer to <http://www.rsm.govt.nz/cms/tools-and-services/publications/public-information-brochures-pibs/pib-21-table-of-radio-spectrum-usage-in-new-zealand> for more information

| Frequency Range | New Zealand Allocation | Summary of usage |
|-------------------|--|--|
| Below 9kHz | Not Allocated | Research of VLF propagation |
| 9-90kHz | 9-90kHz Fixed Mobile | Leaky coaxial cable for communications underground e.g. Mining 30-190kHz SRD usage restricted to telemetry / telecommand |
| 90-190kHz | Amateur Mobile | 30-190kHz SRD telemetry / telecommand usage includes: car locks, alarms and immobilizers shop tag identification systems 30-190kHz SRD usage restricted to telemetry / telecommand 130-190kHz amateur usage |
| 190-200kHz | Aeronautical Radio Navigation | Aeronautical NDBS |
| 285-325kHz | Aeronautical Radio Navigation | Aeronautical non-directional beacons |
| 405-415kHz | Radio Navigation | |
| 415-495kHz | Maritime Mobile | Government maritime mobile services 457kHz avalanche beacons |
| 521-1612kHz | Broadcasting | 521-1 612kHz MF-AM sound broadcasting under MR regime (MR5) 525-1705kHz under ministerial directive |
| 1612-1690kHz | Radio Navigation | Aeronautical non-directional beacons 525-1705kHz under ministerial directive |
| 1690-1800kHz | Fixed Mobile | CT1 cordless telephone base transmitters generally licensed radio buoys government land & maritime mobile services 525-1705kHz under ministerial directive |
| 1800-2000kHz | 1800-1950kHz Amateur Fixed Mobile Except Aeronautical Mobile | Amateur 160m band generally licensed radio buoys government maritime mobile services dgps |
| 1950-2000kHz | Mobile Except Aeronautical Mobile Radio Navigation Radiolocation | Radio buoys land mobile government service non-directional beacon |
| 2000-2065kHz | Fixed Mobile | Maritime mobile land mobile |
| 2065-2107kHz | Maritime Mobile | Maritime mobile |
| 2107-2170kHz | Mobile | Maritime mobile-coast stations land mobile government services |
| 2170- 2173.5kHz | Maritime Mobile | Guard band for 2182kHz |
| 2173.5- 2190.5kHz | Mobile | 2182kHz distress and calling |
| 2190.5- 2194kHz | Maritime Mobile | Guard band for 2182kHz |
| 2194-2300kHz | Fixed Mobile | Predominantly mobile with some fixed usage |
| 2300-2495kHz | Fixed Mobile | Land and maritime mobile with one fixed service licence |
| 2495-2501kHz | Standard Frequency 2.5Mhz | |
| 2505-2850kHz | Mobile | Land, maritime and aeronautical mobile |
| 2850-3025kHz | Aeronautical Mobile (R) | Aeronautical base and sar (3023kHz) |
| 3025- 3155kHz | Aeronautical Mobile(OR) | Commercial and government aeronautical services |
| 3155- 3200 kHz | Mobile Except Aeronautical Mobile (R) | Land mobile simplex and aeronautical mobile(OR) |
| 3200- 3230kHz | Fixed Mobile Except Aeronautical Mobile (R) | Predominantly land mobile with a few fixed assignments |
| 3400- 3500kHz | Aeronautical Mobile (R) | Aeronautical base transmitters at Auckland airport |
| 3500- 3900kHz | Amateur Mobile | 80m amateur band |
| 3900- 3950kHz | Aeronautical Mobile Broadcasting | Land and aeronautical mobile in the lower South Island broadcasting service for the print disabled located in Levin (3935kHz) |
| 3950- 4000kHz | Fixed | Government fixed services |
| 4000- 4063kHz | Fixed Maritime Mobile | Government fixed and maritime mobile services GMDSS / distress and safety calling training licenses |
| 4063- 4438kHz | Maritime Mobile | Private and public coast stations |
| 4438- 4650kHz | Fixed Mobile | Heavily used for fixed and mobile use including maritime mobile. Range of "all New Zealand" fixed services. Fixed service to South Pacific and sub-Antarctic islands. Maritime mobile service to similar areas. Extensive land mobile service to remote locations. |
| 4650- 4700kHz | Aeronautical Mobile (R) | Flight operations based in Auckland |
| 4700- 4750kHz | Aeronautical Mobile(OR) | Government services. Aeronautical communications in remote locations. Planned for use at scott base. |
| 4750- 4850kHz | Fixed Land Mobile | Predominantly government services, lightly used for fixed and mobile use |
| 4850- 4995kHz | Land Mobile | Land mobile simplex services (a few based at coast stations, one at a remote aeronautical base) |
| 4995- 5003kHz | Standard Frequency 5 Mhz | |
| 5005- 5060kHz | Fixed | Government fixed service |
| 5060- 5250kHz | Fixed Land Mobile | Fixed services to South Pacific and sub-Antarctic islands. Minor land mobile use. |
| 5250- 5450kHz | Land Mobile | Land mobile and communications to aeronautical mobile(OR) (helicopters) operating in conjunction with land mobile services. Extensive government and civil defence use. |

| | | |
|-------------------|--|---|
| 5450- 5480kHz | Aeronautical Mobile(OR) Land Mobile | Land mobile service operating in conjunction with aeronautical mobile service |
| 5480- 5680kHz | Aeronautical Mobile (R) | Flight operations based in Auckland, Christchurch, Invercargill, Queenstown and Milford |
| 5680- 5730kHz | Aeronautical Mobile(OR) | Off-route communications especially remote areas, with common sar frequency of 5681.4kHz. |
| 5730- 5900kHz | Mobile Except Aeronautical Mobile (R) | Mainly government mobile services with limited land mobile and meteorological broadcasting from Auckland |
| 5900- 5950kHz | Fixed | Government fixed services |
| 5950- 6200kHz | Broadcasting | Radio New Zealand international 6100kHz |
| 6200- 6525kHz | Maritime Mobile | Extensive maritime mobile usage for ship and coast stations |
| 6525- 6685kHz | Aeronautical Mobile (R) | Flight operations based in Auckland |
| 6685- 6765kHz | Aeronautical Mobile(OR) | Government aeronautical operations with portable stations on 6745.5kHz |
| 6765- 7000kHz | Fixed Mobile | 6765- 6795kHz industry, scientific, and medical and short range device telemetry and telecommand usage |
| 6795- 7000kHz | | Government fixed usage with search and rescue operations on 6911.4kHz. One maritime mobile use. |
| 7000- 7100kHz | Amateur Amateur-Satellite | Amateur 40m band |
| 7100- 7200kHz | Amateur | Amateur |
| 7200- 7300kHz | Broadcasting Amateur | Radio for the print disabled 7290kHz |
| 7300- 7400kHz | Fixed Land Mobile | Government fixed services |
| 7450- 8100kHz | Fixed Land Mobile | Fixed and mobile service for both national and international coverage within the South Pacific and sub-Antarctic islands. Mainly government services including civil defence. |
| 8100- 8195kHz | Fixed Maritime Mobile | |
| 8195- 8815kHz | Maritime Mobile | Extensive use for ship-shore communications |
| 8815- 8965kHz | Aeronautical Mobile (R) | Flight operations based in Auckland |
| 8965- 9040kHz | Aeronautical Mobile(OR) | Mainly government services and flight operations |
| 9040- 9400kHz | Fixed | Government fixed services for national and international coverage within the South Pacific and sub-Antarctic islands. |
| 9400- 9500kHz | Broadcasting Fixed | 31m band radio New Zealand international on 9655kHz and 9700kHz limited government fixed services |
| 9900- 9995kHz | Fixed | Fixed service for both national and international coverage within the South Pacific and sub-Antarctic islands. Mainly government services including department of conservation. |
| 9995- 10003kHz | Standard Frequency 10Mhz | |
| 10.005- 10.100MHz | Aeronautical Mobile (R) | Flight operations in Auckland |
| 10.100- 10.150MHz | Amateur | Amateur 30m band |
| 10.150- 11.175MHz | Fixed | Fixed service for both national and international coverage within the South Pacific and sub-Antarctic islands. Mainly government services. |
| 11.175- 11.275MHz | Aeronautical Mobile(OR) | Mainly government services, with some rural and helicopter off-route usage. |
| 11.275- 11.400MHz | Aeronautical Mobile (R) | Flight operations based in Auckland |
| 11.400- 11.600MHz | Fixed | Government fixed services for international coverage. |
| 11.600- 11.650MHz | Fixed | Fixed service for both national and international coverage within the South Pacific and sub-Antarctic islands. Mainly government services |
| 11.650- 12.050MHz | Broadcasting | 25m band radio New Zealand international on 11.735MHz and 11.90MHz |
| 12.050- 12.100MHz | Fixed | Fixed service for both national and international coverage within the South Pacific and sub-Antarctic islands. Mainly government services |
| 12.100- 12.230MHz | Fixed | Fixed service for both national and international coverage within the South Pacific and sub-Antarctic islands. Mainly government services |
| 12.230- 13.200MHz | Maritime Mobile | Maritime mobile ship to shore communications |
| 13.200- 13.260MHz | Aeronautical Mobile(OR) | Off route flight operations in Auckland and Taupo including communications to rescue helicopters |
| 13.260- 13.360MHz | Aeronautical Mobile (R) | Flight operations in Auckland |
| 13.360- 13.410MHz | Fixed | Fixed service for both national and international coverage within the South Pacific and sub-Antarctic islands. Mainly government services including the meteorological and department of conservation communications. |
| 13.410- 13.570MHz | Fixed Mobile | |
| | | 13.550- 13.570MHz industry, scientific, and medical & short range device telemetry and telecommand usage |
| 13.570- 13.600MHz | Fixed | Meteorological communications to Raoul Island |
| 13.870- 14.000MHz | Fixed | International government fixed service communications to Antarctic bases. |
| 14.000- 14.250MHz | Amateur Amateur-Satellite | Amateur 20m band |
| 14.250- 14.350MHz | Amateur | |
| 14.350- 14.990MHz | Fixed | Fixed service for both national and international coverage within the Pacific and sub-Antarctic islands. Mainly government services including the meteorological communications. |
| 14.990- 15.005MHz | Standard Frequency 15Mhz | |
| 15.010- 15.100MHz | Aeronautical Mobile(OR) | Off route flight operations in Auckland and Taupo. Government off-route aeronautical use. |

| | | |
|-------------------|---|---|
| 15.100- 15.600MHz | Broadcasting | Radio New Zealand International on 15.115MHz |
| 15.600- 15.800MHz | Fixed | Fixed service for both national and international coverage within the Pacific and sub-Antarctic islands. Mainly government services including meteorological communications. |
| 15.800- 16.360MHz | Fixed | Fixed service for both national and international coverage within the Pacific and sub-Antarctic islands. Mainly government services including department of conservation and meteorological communications. |
| 16.360- 17.410MHz | Maritime Mobile | Extensive private and public coast station usage throughout New Zealand. |
| 17.410- 17.480MHz | Fixed | Government fixed service international coverage to Pacific islands. |
| 17.480- 17.550MHz | Fixed | Government fixed service for both national and international coverage within the Pacific and sub-Antarctic islands. |
| 17.550- 17.900MHz | Broadcasting Fixed | Government fixed service assignments for Trans-Tasman sea communications |
| 17.900- 17.970MHz | Aeronautical Mobile (R) | Flight operations in Auckland |
| 17.970- 18.030MHz | Aeronautical Mobile(OR) | Off route flight operation communications to the South Pacific and around Auckland and Taupo |
| 18.030- 18.052MHz | Fixed | Government fixed service assignments for Trans-Tasman sea communications |
| 18.052- 18.068MHz | Fixed | |
| 18.068- 18.168MHz | Amateur | Amateur 17m band |
| 18.168- 18.780MHz | Fixed | Government fixed service for both national and international coverage within the Pacific and sub-Antarctic islands. |
| 18.780- 18.900MHz | Maritime Mobile | Maritime simplex radiotelephone to ships in the South Pacific. |
| 18.900- 19.020MHz | Broadcasting | |
| 19.020- 19.680MHz | Fixed | Government fixed service assignments for Trans-Tasman sea and South Pacific communications |
| 19.680- 19.800MHz | Maritime Mobile | Maritime duplex radiotelephone to ships in the South Pacific. |
| 19.800- 19.990MHz | Fixed | Government fixed service assignments for national communications |
| 19.990- 19.995MHz | Standard Frequency 20 Mhz | |
| 20.010- 21.000MHz | Fixed | Government fixed service for both national and international coverage within the Pacific and sub-Antarctic islands. One commercial circuit to scott base (Antarctica). |
| 21.000- 21.450MHz | Amateur | Amateur 15m band |
| 21.450- 21.850MHz | Broadcasting Fixed | Government fixed service for international coverage |
| 21.850- 21.870MHz | Fixed | Government fixed service assignments for national communications |
| 21.870- 21.924MHz | Fixed | Government fixed service for international coverage |
| 21.924- 22.000MHz | Aeronautical Mobile (R) | Flight operations in Auckland |
| 22.000- 22.855MHz | Maritime Mobile | Ship and shore communications |
| 22.855- 23.000MHz | Fixed | Government fixed service for both national and international coverage within the Pacific and sub-Antarctic islands. One commercial circuit to Pitcairn Island. |
| 23.200- 23.350MHz | Aeronautical Mobile(OR) | Government aeronautical(OR) services for national communications, and international communications within the South Pacific. |
| 23.350- 24.000MHz | Fixed | Government fixed service for both national and international coverage within the Pacific and sub-Antarctic islands. |
| 24.890- 24.990MHz | Amateur Amateur-Satellite | Amateur 12m band |
| 24.990- 25.005MHz | Standard Frequency 25 Mhz | |
| 25.010- 25.070MHz | Fixed Mobile | Government fixed service for national coverage |
| 25.070- 25.210MHz | Maritime Mobile | Government maritime service for national communications and international communications within the South Pacific |
| 25.210- 25.550MHz | Fixed Mobile | Government services for national communications. |
| 25.550- 25.670MHz | Fixed | Government fixed services for national communications |
| 25.670- 26.100MHz | Broadcasting | 11m band |
| 26.100- 26.175MHz | Maritime Mobile | |
| 26.175- 27.500MHz | Fixed Mobile Except Aeronautical Mobile | 26.175- 26.3MHz meteorological (auroral radar) at Birdlings Flat and government fixed services for national communications |
| 26.32- 26.78MHz | | Citizen band "CB" radio service |
| 26.78- 26.95MHz | | Government fixed service for national coverage |
| 26.95- 27.3MHz | | Local area paging services ISM usage SRD unrestricted usage 27.12MHz amateur |
| 27.3- 27.5MHz | | Government fixed services for national and international communications |
| 27.500- 28.000MHz | Fixed Mobile | Government fixed and mobile services to for national and international communications within the South Pacific wavebuoy telemetry at Mokohinau |
| 28.000- 29.700MHz | Amateur Amateur-Satellite | Amateur 10m band |
| 29.700- 30.005MHz | Fixed Mobile | 29.7-30.0 short range device unrestricted usage 29.775-29.785 government 29.8-30.00 telemetry device usage |
| 30.01 - 37.5MHz | Fixed Mobile | 30.4-37.5MHz government services for national and international communications within the South Pacific and sub-Antarctic islands 30.05-30.8MHz cordless telephone "CT1 band" base transmit 30.8-32MHz short range device model control/model aircraft control usage 31.3-31.6 radio paging usage 33.40MHz television sound intermediate frequency 35-35.5MHz short range device model aircraft control usage 35.5-37.2MHz short range device unrestricted and telemetry device usage |

| | | |
|---------------------------|--|--|
| 37.5 - 38.25MHz | Fixed Mobile | 38 - 39.986MHz government services for national and international communications within the South Pacific and sub-Antarctic islands 38.90MHz television vision intermediate frequency 39.2MHz telemetry device usage 39-39.7MHz short range device usage 39.7-40.5MHz cordless telephone "CT1 band" mobile transmit |
| 39.986 - 40.02MHz | Fixed Mobile | |
| 40.020 - 40.980MHz | | 40.02 - 40.98MHz government services for national and international communications 40.68MHz radio paging 40.5 - 40.66MHz short range device model aircraft control usage 40.66 - 40.7MHz short range device unrestricted usage 40.7 - 40.8MHz short range device model aircraft control usage 40.8 - 41MHz short range device unrestricted usage |
| 40.98 - 41.015 | | 40.8-41MHz short range device unrestricted usage 40.98-44MHz government services for national and international communications auroral radar at birdlings flat general user radio licence for short range devices general user radio licence for cordless telephones |
| 44 - 47MHz | Broadcasting | 44-51MHz VHF television broadcasting under MR regime (MR7) radio spectrum auctions |
| 47 - 50MHz | Broadcasting | 44-51MHz VHF television broadcasting under MR regime (MR7) |
| 50 - 54MHz | 50-51 Mhz Fixed Mobile Broadcasting Amateur | |
| 54 - 68MHz | Fixed Mobile Broadcasting | VHF television broadcasting under MR regime (MR8) |
| 68 - 74.8MHz | Fixed Mobile | 72 - 72.25MHz short range device auditory aids 72.25 - 72.5MHz short range device unrestricted usage 72-73MHz CT1 cordless telephones |
| 74.8 - 75.2MHz | Aeronautical Radio Navigation | Aeronautical marker beacons ILS locator beacons |
| 75.2 - 75.4MHz | Mobile | 75.2 - 76.3MHz land mobile "ESA" band (emergency services base transmit) |
| 75.4 - 87MHz | 76.3-78.1 Mhz Not Allocated | |
| 78.1-79.2MHz | | Land mobile "ESA" band (emergency services) mobile transmit |
| 81 - 88MHz | Mobile | Land mobile "A" band including some government services |
| 88-88.8MHz | | Radio public address systems 88.0-88.8MHz low power FM bc use 88-108MHz under ministerial directive |
| 88.8-106.63MHz | | VHF-FM sound broadcasting (Band II) under MR regime (MR43) 88-108MHz under ministerial directive |
| 100-106.63MHz | Broadcasting | Extension to FM sound broadcasting band under MR regime |
| 106.63 - 108MHz | Broadcasting | Low power FM BC use 107-108MHz short range devices 88-108MHz under ministerial directive |
| 108 - 117.975MHz | Aeronautical Radio Navigation | 108-112MHz ILS localisers at some airports |
| 112 - 117.975MHz | | VOR aeronautical beacons |
| 117.975 - 137MHz | Aeronautical Mobile (R) | 117.975-137MHz widespread aeronautical use 121.5MHz search and rescue service: COSPAS-SARSAT EPIRB transmissions 123.1MHz low power search and rescue transceivers 132-132.6MHz aeronautical repeaters base transmit 135.4-136MHz aeronautical repeaters base receive 136-137MHz government aeronautical use |
| 137 - 137.025MHz | Mobile-Satellite (Space- To-Earth) Meteorological - Satellite (Space-To-Earth) Fixed Mobile | 137-138MHz government service usage |
| 138 - 143.6MHz | Mobile | 138-144MHz land mobile "ESB Band" heavily utilised for emergency services predominantly New Zealand ambulance and civil defence groups 138.0-140.5MHz mobile transmit 140.5-141MHz simplex 141. -143.5MHz base transmit 143.5-144MHz simplex |
| 144 - 146MHz | Amateur Amateur Satellite | 144-148MHz amateur 2m band widespread use of both simplex and repeater services limited government service usage |
| 146 - 148MHz | Amateur | |
| 148.000 - 149.900MHz | Mobile Mobile-Satellite (Earth-To-Space) | Civil defence and emergency service use throughout New Zealand, migrating to other bands by 2004 |
| 149.900 - 150.050MHz | Radio Navigation - Satellite Mobile-Satellite (Earth-To- Space) | |
| 150.050 - 156.7625MHz | Mobile | 150.050 - 156MHz land mobile "EN" band extensive nationwide use |
| 156-157.6MHz | Maritime Mobile | Maritime mobile VHF band |
| 156.7625 - 156.8375MHz | Maritime Mobile (Distress And Calling) | |
| 157.6-162.2MHz | Mobile | 157.6 - 157.8MHz mobile radio reporter"RR" band 157.6 - 158.07MHz wide-area paging band 158.07 - 160.1MHz land mobile "MS" special services band 158.0750 - 158.575MHz mobile transmit 158.6 - 160.1MHz simplex services including bush winch operations 160.1 - 160.6MHz short range device unrestricted usage 160.1 - 160.3MHz telemetry and telecommand 160.3 - 160.6MHz radio paging 160.6 - 160.970MHz maritime mobile VHF band 160.970 - 161.490MHz land mobile "MS" special services band 161.490 - 162.2MHz maritime mobile VHF band |

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| 162.2-174MHz | Mobile | 162.2 - 162.46MHz fixed"EE" band 162.56 - 165.33MHz land mobile"EE" band 165.45 - 165.7MHz fixed"EE" band 166.32 - 166.6MHz wide- area paging "WP" band 166.8 0 - 167.0MHz fixed"EE" band 167.18 - 169.93MHz land mobile"EE" band 170.05 - 170.3MHz fixed"EE" band 170.3 - 173.0MHz mobile simplex special services including bush winch operations 173 - 174MHz short range devices with some fixed and land mobile simplex use |
| 174 - 223MHz | Broadcasting | 174 - 230MHz under MR regime (MR49) VHF television (Band III) radio microphones |
| 230 - 235MHz | Fixed Mobile Aeronautical Radio Navigation | 230-300MHz extensive government service usage. |
| 235 - 267MHz | Fixed Mobile | 230-300MHz extensive government service usage. 235-300MHz short range device telemetry and telecommand usage 243MHz search and rescue service |
| 267 - 272MHz | Fixed Mobile | |
| 272 - 273MHz | Fixed Mobile | |
| 273 - 312MHz | Fixed Mobile | 273-300MHz extensive government service usage 300-322MHz short range device telemetry and telecommand |
| 273- 312MHz | Fixed Mobile | 273- 300MHz extensive government service usage 300- 322MHz SRD telemetry and telecommand 305- 328.6MHz extensive government service usage |
| 328.6- 335.4MHz | Aeronautical Radio Navigation | Aeronautical ILS glidepath transmitters at airports |
| 335.4- 387MHz | Fixed Mobile | 335.4- 399.9MHz extensive government usage |
| 399.9- 400.05MHz | Radio Navigation Satellite | |
| 400.05- 400.15MHz | Standard Frequency And Time Signal- Satellite | |
| 400.15- 401MHz | Meteorological Aids Meteorological- Satellite (Space- To- Earth) | Meteorological radio- sondes at Invercargill and Paraparaumu airports |
| 401- 402MHz | Meteorological Aids Earth Exploration- Satellite (Earth- To- Space) Meteorological- Satellite (Earth- To- Space) Fixed Land Mobile | Meteorological aids nationwide land mobile usage is restricted to medical telemetry |
| 403- 406MHz | Meteorological Aids Fixed Mobile | Meteorological aids nationwide land mobile usage is restricted to medical telemetry some government fixed and mobile service usage |
| 406- 406.1MHz | Mobile- Satellite (Earth- To- Space) | Limited to the operation of EPIRBS |
| 406.1- 410MHz | Fixed Mobile | Analog land mobile trunked dispatch "TD" band mobile transmit 406.1- 410MHz |
| 410- 420MHz | | Planned to become td mobile transmit 410- 412MHz |
| 412- 414MHz | | Planned for TD simplex and simplex fixed services |
| 418- 420MHz | | Planned to become TD base transmit |
| 420- 430MHz | Fixed Mobile Except Aeronautical Mobile | 420- 425MHz fixed "I" band alpha transmit 425 - 430MHz fixed "I" band beta transmit |
| 430- 432MHz | Radiolocation Amateur Amateur Satellite | Amateur 70m band used throughout New Zealand |
| 432- 438MHz | | 433.05- 434.79MHz SRD telemetry and telecommand 435- 438MHz amateur satellite |
| 440- 450MHz | Fixed Mobile Except Aeronautical Mobile Radiolocation | 440- 449MHz fixed"JL" band, providing migration spectrum for I band links. STLS accommodated in 444- 445MHz 444- 445MHz SRD biomedical telemetry usage |
| 449.750- 450MHz | | Land mobile "CNX" band simplex |
| 450- 455MHz | Fixed | 450- 450.275MHz fixed "JC" band (11 x 25kHz single frequency channels) |
| | Mobile | 450.275- 453.3:MHz land mobile"C" band, mobile transmit 453.3- 453.625:MHz land mobile "CNX" band simplex |
| | Fixed | 453.625- 454.975MHz fixed "JB" band alpha transmit (53 x 25kHz two frequency channels interleaved with 108 x 12.5kHz two frequency channels). |
| | Mobile | 454.975- 455.31225:MHz land mobile"C" band simplex 455.312255- 458.3375:MHz land mobile"C" band base transmit |
| | | 458.3375- 458.5375MHz land mobile "D" band simplex |
| | Mobile | 458.5375- 458.6125MHz radio paging, and SRD unrestricted usage |
| | | 458.6125- 458.6625MHz land mobile "D" band simplex |
| | Fixed | 458.6625- 460.0125MHz fixed "JB" and "JNB" band beta transmit (53 x 25kHz two frequency channels interleaved with 108 x 12.5kHz two frequency channels). 460.025- 461.425MHz fixed "jd" band alpha transmit (28 x 50kHz channels) 461.425- 461.475MHz fixed "je" band (1 x 50kHz single frequency channel) |
| | Mobile | 461.475- 461.8125MHz land mobile "DNX" band simplex channels 21- 47 461.8125- 464.8125MHz land mobile "dn" band base transmit 464.8125- 465.1875MHz land mobile "DNX" band simplex channels 48- 77 |
| | Fixed | 465.1875- 465.2375MHz fixed "JF" band (1 x 50kHz single frequency channel) 465.2375- 466.6375MHz fixed "JD" band beta transmit (28 x 50kHz channels) |
| | Mobile | 466.675- 466.8MHz land mobile "DNX" band simplex channels 78- 87 |
| | | 466.8- 466.850MHz SRDS and telemetry and telecommand (biomedical telemetry only) |

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| | | 466.85- 467.0MHz land mobile "DNX" band simplex channels 88- 99 467.0- 470.0MHz "DN" band mobile transmit |
| 470- 585MHz | Mobile | 470- 470.5MHz SRD usage (biomedical telemetry only) |
| | Mobile | 470.5- 471MHz land mobile "FNN" band simplex (12.5kHz channels 101- 140) |
| | | 471.0- 471.5MHz SRD and telemetry and telecommand usage |
| | | 471.5- 472.0MHz land mobile "FNN" band simplex (12.5kHz channels 201- 240, 472.0- 476.0MHz land mobile "FN" band mobile transmit channels 1- 320 476.0- 476.4MHz land mobile "FNN" band simplex (12.5kHz channels 301- 332 |
| | | 476.400- 477.425MHz personal radio service "PRS" band |
| | | 477.425- 477.9875MHz land mobile "FNN" band simplex (12.5kHz channels 501- 660) 477.9875- 481.9875MHz land mobile "FN" band base transmit channels 1- 320 |
| | | 481.9875- 483.9875MHz land mobile "FNN" band simplex (12.5kHz channels 501- 600) |
| | | 483.9875- 487.9875MHz land mobile "FN" band base transmit channels 321- 640 487.9875- 490.0MHz land mobile "FNN" band simplex (12.5kHz channels 701- 861) 490.0- 494.0MHz land mobile "FN" band mobile transmit channels 321- 640 |
| | | 494- 502MHz under ministerial directive |
| | 502- 806 Mhz Broadcasting | Uhf television (band iv) 502- 518MHz: block 0 |
| | | Uhf television (band iv) 28 x 8MHz channels in 7 blocks under the management right regime 518- 550MHz: block 1 550- 582MHz: block 2 MR1 |
| | | Uhf television (band v) 582- 614MHz: block 3 m@ri television service MR195 |
| 610- 890MHz | | 614- 646MHz: block 4 (government reserved) SRDS, audio/video senders in particular and amateur use under ministerial directive |
| | | Uhf television (band v) 646- 678MHz: block 5 678- 710MHz: block 6 710- 742MHz: block 7 742- 774MHz: block 8 774- 806MHz: block 9 radio microphones |
| | Fixed | 806- 812MHz fixed "KK" band alpha transmit (11 x 500kHz channelling) |
| | Mobile | 812- 813MHz land mobile "ESD" band (emergency services) mobile transmit 813- 814MHz land mobile expanded ts bands (trunked dispatch) mobile transmit 814- 819MHz land mobile "TS" band (trunked dispatch) mobile transmit 819- 824MHz SRD and spread spectrum device usage 824- 825.015MHz amps extension band |
| | Mobile | 825.015- 845MHz amps / damps cellular band (private management rights) |
| | | 845- 849MHz alternative pairing with 890- 894MHz for cellular telephony |
| | Fixed | 849- 851MHz studio to transmitter linking |
| | Fixed Mobile | 851- 857MHz fixed "KK" band beta transmit (11 x 500kHz channelling) |
| | | 857- 858MHz land mobile "ESD" band (emergency services base transmit |
| | | 858- 859MHz land mobile expanded ts bands (trunked dispatch) base transmit 859- 864MHz land mobile "TS" band (trunked dispatch) base transmit 862- 870MHz possible SRD GURL band |
| | | 864- 868.1MHz cordless telephone "CT2" band 864- 868MHz spread spectrum devices 862- 870MHz possible SRD GURL band |
| | | 868.1- 869.025MHz land mobile "TX" band simplex operation 862- 870MHz possible SRD GURL band |
| | | 869.025- 870.015MHz amps extension band |
| | Fixed Mobile | 870.015- 890MHz amps / damps cellular band (private management rights) |
| 890- 942MHz | Fixed Mobile | 890- 915MHz GSM cellular band (private management rights- mobile transmit) |
| | | 915- 921MHz fixed "K" band- studio transmitter links 915- 921MHz SRD telemetry and telecommand usage (3mw) |
| | | 921- 929MHz ISM, SRD, and amateur usage 922- 927MHz |
| | | 929- 935MHz "K" band - studio- transmitter links |
| | | |
| | Fixed Mobile | 935- 960MHz GSM cellular band private management rights- base transmit |
| 960- 1164MHz | Aeronautical Radio Navigation | Aeronautical radio navigation (distance measuring equipment and secondary surveillance radar) |
| 1215- 1240MHz | Radiolocation Radio Navigation- Satellite | Radiolocation radio navigation |
| 1240- 1300MHz | Radiolocation Radio Navigation- Satellite Amateur | 1240- 1300MHz radiolocation amateur |
| 1300- 1350MHz | Aeronautical Radio Navigation Radiolocation | Radiolocation and radio navigation - primary surveillance radar at major airports |
| 1350- 1400MHz | Radiolocation | |
| 1400- 1427MHz | Radio Astronomy Space Research (Passive) | Astronomy and space research all emissions prohibited |
| 1427- 1429MHz | Fixed | 1427- 1429.5MHz fixed "I" band for narrow band high efficiency digital fixed links, alpha transmit 1429- 1461.5MHz fixed "I" band point to point linking alpha transmit |
| | Fixed Broadcasting Broadcasting Satellite (Sound) | 1461.5- 1490MHz digital audio broadcasting (DAB) 1461.5- 1490MHz under ministerial directive 1490- 1492MHz fixed "I" band beta transmit |
| 1492- 1518MHz | Fixed | 1492- 1522MHz fixed "I" band beta transmit 1522- 1525MHz fixed "I" band for narrow band high efficiency digital fixed links , beta transmit |
| 1525- 1530MHz | Mobile- Satellite (Space- To- Earth) | 1525- 1559MHz mobile satellite (space- to- earth) - Immarsat downlinks paired with 1626.5- 1660.5MHz |

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| 1559- 1610MHz | Radio Navigation- Satellite (Space- To- Earth) | 1559- 1610MHz radio navigation satellite (space- to- earth) global positioning system (GPS) |
| 1610- 1610.6MHz | Mobile Satellite (Earth- To- Space) | 1610- 1626.5MHz mobile- satellite (earth- to- space) paired with 2483.5MHz |
| 1626.5- 1660MHz | Mobile- Satellite (Earth- To- Space) | 1626.5- 1660MHz mobile satellite (earth- to- space) - Immarsat uplinks paired with 1525- 1559MHz |
| 1660- 1660.5MHz | Radio Astronomy | |
| 1660.5- 1668MHz | Radio Astronomy Space Research (Passive) Meteorological Aids | |
| 1670- 1675MHz | Meteorological Aids Fixed Meteorological- Satellite (Space- To- Earth) Mobile | Meteorological satellite downlinks |
| 1675- 1690MHz | Meteorological- Satellite (Space- To- Earth) | 1675- 1710MHz meteorological - satellite downlinks |
| 1710- 1930MHz | Fixed Mobile | 1710- 1880MHz private management rights - suitable for 2nd and 3rd generation cellular technologies and fixed services. |
| | | 1880- 1900MHz generally licensed dect systems 1895- 1920MHz generally licensed PHS service |
| | | 1920- 1980MHz private management rights - suitable for 2nd and 3rd generation cellular technologies and fixed services. |
| 1980- 2010MHz | Fixed Mobile Mobile- Satellite (Earth- To- Space) | 1980- 2010MHz fixed point to point links and possible future mobile satellite uplinks. |
| 2010- 2025MHz | Fixed Mobile | 2010- 2025MHz private management rights - suitable for tdd, 3G cellular technologies and fixed services. |
| 2025- 2110MHz | | 2025- 2110MHz private management right suitable for fwa and fixed services |
| 2110- 2120MHz | | 2110- 2170MHz private management rights suitable for 2nd and 3rd generation cellular technologies |
| 2170- 2200MHz | Fixed Mobile Mobile- Satellite (Space- To- Earth) | 2170- 2200MHz fixed point to point links and possible future mobile satellite downlinks. |
| 2200- 2290MHz | Fixed Mobile | 2200- 2300MHz private management rights- suitable for FWA and fixed services. |
| 2300- 2450MHz | Fixed Mobile Amateur | 2300- 2396MHz 12 x 8MHz private management rights suitable for mmds, FWA or fixed services |
| | | 2396- 2400MHz amateur usage |
| | | 2400- 2450MHz ISM band, SRDS, amateur and some extensive broadband linking using spread spectrum technologies e.g. Wifi, wireless lans |
| 2450- 2483.5MHz | Fixed Mobile | 2450- 2483.5MHz ISM band, SRDS and extensive broadband fixed linking using spread spectrum technologies. This band identified for bluetooth and RLAN technologies. LSM usage includes microwave oven operation |
| 2483.5- 2500MHz | Fixed Mobile Mobile- Satellite (Space- To- Earth) | ISM band mobile- satellite (space- to- earth) paired with 1610MHz |
| 2500- 2520MHz | Fixed | 2500- 2690MHz "O" band itinerant fixed linking for television outside broadcast operations spectrum identified for possible expansion of 3rd generation cellular services. |
| 2690- 2700MHz | Radio Astronomy Space Research | Astronomy space research |
| 2700- 2900MHz | Aeronautical Radio Navigation Radiolocation Fixed Under | Aeronautical navigation radiolocation (including radar) 2700- 2900 fixed "OX" band itinerant fixed linking for television outside broadcast operations |
| 2900- 3100MHz | Radio Navigation Radiolocation | Radiolocation (including radar) 2900- 3400MHz SRDS |
| 2900- 3100MHz (continued) | Radio Navigation Radiolocation | Radiolocation (including radar) 2900- 3400MHz spread spectrum devices |
| 3100- 3300MHz | Radiolocation | |
| 3300- 3400MHz | Radiolocation Amateur | Radiolocation amateur 2900- 3400MHz short range device radiolocation usage |
| 3400- 3500MHz | 3400- 3410 Mhz Radiolocation Amateur Amateur Satellite | Amateur |
| | 3410- 3500 Mhz Fixed Radiolocation | 3410- 3487MHz under management right (the # signifies an integer identification number) MR regime crown and private management right (the # signifies an integer identification number) MRS |
| 3500- 3700MHz | 3500- 3589 Mhz Fixed Radiolocation | 3510- 3587MHz under management right (the # signifies an integer identification number) regime crown and private management rights (the # signifies an integer identification number) |
| | 3589- 3700 Mhz Fixed Fixed- Satellite (Space- To- Earth) | |
| | | 3600- 4200MHz fixed"P" band- usage must be co-ordinated with"C" band satellite services. |
| 3700- 4200MHz | Fixed Fixed- Satellite (Space- To- Earth) | |

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| 4200- 4400MHz | Aeronautical Radio Navigation | Radio altimeters and associated ground transponders. |
| 4400- 4500MHz | Fixed | 4400- 5000MHz fixed "PC" band planned fixed satellite service (space- to- earth) as per international radio regulations appendix 30b |
| 5030- 5150MHz | Radiolocation Radio Navigation | Radiolocation, radio navigation - possible future use for microwave landing system (microwave landing system) |
| 5150- 5250MHz | Aeronautical Radio Navigation Mobile Except Aeronautical Mobile | 5150- 5350MHz short range device usage, plan in particular usage of 5150- 5250MHz restricted to indoor wireless lans. |
| 5255- 5350MHz | Mobile Except Aeronautical Mobile | Wireless lan |
| 5350- 5460MHz | Aeronautical Radio Navigation | Restricted to airborne radar and associated beacons |
| 5470- 5570MHz | Maritime Radio Navigation Radiolocation | Ground based meteorological radar with co- primary status 5470- 5725MHz short range device radiolocation |
| 5570- 5650MHz | Radiolocation | 5470- 5725MHz short range device radiolocation |
| 5650- 5725MHz | Radiolocation Amateur | 5650- 5725MHz radiolocation 5725- 5830MHz amateur radio beacons 5725- 5875MHz short range device and ISM usage 5725- 5825MHz short range device (fixed radio links) |
| 5725- 5830MHz | Amateur | |
| 5830- 5850MHz | Radiolocation Amateur Amateur Satellite (Space- To- Earth) | |
| 5850- 5925MHz | Fixed | |
| 5925- 6700MHz | Fixed Fixed- Satellite (Earth- To- Space) | 5875- 5925MHz no published channel plan. 5925- 6420MHz fixed "R" band 5925- 6700MHz fixed satellite service"C" band uplinks (Immarsat) 6420- 7100MHz fixed "T" band 6725- 7025MHz planned fixed satellite service allocation as per international radio regulations appendix 30b |
| 7075- 7145MHz | Fixed | 7100- 7425MHz fixed "V" band utilised for point to point linking and itinerant tv outside broadcasting. |
| | | 7425- 7730MHz fixed "U" band for point to point linking |
| | Fixed | 7730- 8290MHz fixed "W" band for point to point linking |
| 8215- 8400MHz | | |
| | Fixed | 8290- 8500MHz fixed "Y" band utilised for point to point linking |
| 8500- 8550MHz | Radiolocation | |
| 8750- 8850MHz | Radiolocation Aeronautical Radio Navigation | |
| 8850- 9000MHz | Radiolocation Maritime Radio Navigation | |
| 9000- 9200MHz | Aeronautical Radio Navigation | |
| 9200- 9300MHz | Radiolocation Maritime Radio Navigation | Maritime radio navigation limited to shore based radar |
| 9300- 9500MHz | Radio Navigation Radiolocation | Some government usage meteorological radar shore based harbour control radar |
| 9500- 9800MHz | Radiolocation Radio Navigation | |
| 9800- 10000MHz | Radiolocation | |
| 10- 10.45GHz | Radiolocation Amateur | 10.00- 10.50GHz radiolocation amateur |
| 10.5- 10.55GHz | Fixed | Fixed "H" band used for point to point linking |
| 10.68- 10.7GHz | Radio Astronomy Space Research (Passive) | Space research (passive) |
| 10.7- 11.7GHz | Fixed | Fixed "Z" band used for point to point linking |
| 11.7- 12.2GHz | Broadcasting Satellite | Possible planning to utilise international radio regulations appendix 30 bss assignments 11.7- 12.2GHz under ministerial directive |
| 12.2- 12.5GHz | Broadcasting (Including Datacasting) Fixed Satellite (Space- To- Earth) | 12.2- 12.375GHz fixed satellite (VSAT and DTH), subject to datacasting operations at some locations. |
| | Fixed Satellite (Space- To- Earth) | 12.375- 12.5GHz fixed satellite (VSAT and DTH) |
| 12.5- 12.75GHz | Broadcasting Satellite Fixed- Satellite (Space- To- Earth) | Television service delivery via satellite |
| 12.75- 13.25GHz | Fixed | Fixed "X" band point to point linking including inter- cell site linking |
| 13.25- 13.4GHz | Earth Exploration- Satellite (Active) Aeronautical Radio Navigation Space Research (Active) | Aeronautical radio navigation |
| 13.4- 13.75GHz | Earth Exploration- Satellite (Active) Radiolocation Space Research | Government radiolocation usage |

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| 13.75- 14GHz | Fixed Satellite (Earth- To- Space) | |
| 14- 14.25GHz | Fixed- Satellite (Earth- To- Space) | Satellite uplinks supporting fixed satellite service DTH and TV service via satellite delivery in 12.2- 12.75GHz |
| 14.5- 14.8GHz | Fixed | Fixed “G” band for point to point linking |
| 15.35- 15.4GHz | Radio Astronomy Space Research (Passive) | |
| 15.4- 15.43GHz | Aeronautical Radio Navigation | |
| 15.43- 15.63GHz | Fixed- Satellite (Space- To- Earth) (Earth- To- Space Aeronautical Radio Navigation | |
| 15.63- 15.7GHz | Aeronautical Radio Navigation | |
| 15.7- 16.6GHz | Radiolocation | 15.70- 17.30GHz short range device radiolocation usage |
| 16.6- 17.1GHz | Radiolocation Space Research (Deep Space) (Earth- To- Space) | |
| 17.1- 17.2GHz | Radiolocation | |
| 17.2- 17.3GHz | Earth Exploration- Satellite (Active) Radiolocation Space Research (Active) | |
| 17.3- 17.7GHz | Fixed- Satellite (Earth- To- Space) Radiolocation | |
| 17.7- 18.1GHz | Fixed | 17.7- 19.7GHz fixed “18g” band used for point to point linking, especially for inter cell site linking |
| 18.6- 18.8GHz | Fixed | Fixed “18g” band used for point to point linking especially for inter cell site linking |
| 18.8- 19.3GHz | Fixed Fixed- Satellite (Space- To- Earth) | |
| 19.3- 19.7GHz | Fixed | |
| 19.7- 20.1GHz | Fixed- Satellite (Space- To- Earth) | Mobile- satellite (space- to- earth) |
| 21.2- 21.4GHz | Fixed | 21.2- 23.6GHz fixed “23g” band used for point to point linking |
| 22.5- 22.55GHz | Fixed | 21.2- 23.6GHz fixed “23g” band used for point to point linking |
| 23.6- 24GHz | Radio Astronomy Space Research (Passive) | |
| 24- 24.05GHz | Amateur Amateur- Satellite | Amateur usage short range device> SRD, spread spectrum devices and ISM usage |
| 24.05- 24.25GHz | Radiolocation Amateur | Amateur usage (including beacons) 24.0- 24.25GHz short range device unrestricted usage and industry, scientific, and medical usage |
| 24.25- 24.45GHz | Radio Navigation Fixed Mobile | |
| 24.45- 24.65GHz | Fixed Mobile Radio Navigation | 24.549- 25.392GHz private management rights suitable for LMDS and fixed services |
| 24.65- 24.75GHz | Fixed Mobile | |
| 24.75- 25.25GHz | Fixed Mobile | |
| 25.25- 25.5GHz | Fixed Mobile | |
| 25.5- 27GHz | Earth Exploration- Satellite (Space- To Earth) Fixed Inter- Satellite Mobile Standard Frequency And Time Signal- Satellite (Earth- To- Space) | 25.555- 28.35GHz 6 private management rights suitable for LMDS and fixed services |
| 27- 27.5GHz | Fixed Fixed- Satellite (Earth- To- Space) Inter- Satellite Mobile | |
| 27.5- 28.5GHz | Fixed Fixed- Satellite (Earth- To- Space) Mobile | |
| 28.5- 29.1GHz | Fixed Fixed- Satellite (Earth- To- Space) Mobile | |
| 29.1- 29.5GHz | Fixed Fixed- Satellite (Earth- To- Space) Mobile | |
| 29.9- 30GHz | Fixed- Satellite (Earth- To- Space) Mobile- Satellite (Earth- To- Space) | |
| 30- 31GHz | Fixed- Satellite (Earth- To- Space) Mobile- Satellite (Earth- To- Space) | |
| 31- 31.3GHz | Fixed | Fixed point to point linking |

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| 31.3- 31.5GHz | Radio Astronomy Space Research (Passive) Radio Navigation | |
| 31.5- 31.8GHz | Radio Astronomy Space Research (Passive) Fixed Mobile Except Aeronautical Mobile | |
| 31.8- 32GHz | Fixed Radio Navigation | |
| 32- 32.3GHz | Fixed Radio Navigation | |
| 32.3- 33GHz | Fixed Radio Navigation | |
| 33- 33.4GHz | Fixed Radio Navigation | |
| 33.4- 34.2GHz | Radio Location | 33.4- 36GHz SRD radiolocation usage |
| 34.2- 34.7GHz | Radio Location | |
| 34.7- 35.2GHz | Radio Location | |
| 35.2- 35.5GHz | Meteorological Aids Radio Location | |
| 35.5- 36GHz | Meteorological Aids Radio Location Space Research (Active) | |
| 36- 37GHz | Fixed Mobile Space Research | |
| 37- 37.5GHz | Fixed | Fixed "38g" band 37.058- 38.178GHz alpha transmit 38.248- 39.438GHz beta transmit extensive use for inter- cell site linking |
| 43.5- 47GHz | | 46.7- 46.9GHz SRD field disturbance sensor usage |
| 47- 47.2GHz | Amateur Amateur- Satellite | Amateur usage |
| 50.4- 51.4GHz | Fixed | 50.5- 51.15GHz fixed "50G" band 50.42- 50.62GHz alpha transmit 50.92- 51.12GHz beta transmit 51.15- 51.4GHz not allocated |
| 54.25- 55.78GHz | Space Research (Passive) | |
| 57- 58.2GHz | Fixed | Fixed "60g" band 57.2- 57.7GHz alpha transmit 57.7- 58.2GHz beta transmit short range broadband linking in Wellington |
| 59- 59.3GHz | | 59- 64GHz SRD radiolocation usage |
| 59.3- 64GHz | | 59- 64GHz SRD radiolocation usage 61- 61.5GHz ISM usage |
| 64- 65GHz | Fixed Mobile | |
| 76- 77.5GHz | | 76- 77GHz SRD field disturbance sensor usage |
| 81- 84GHz | Radio Location Amateur Amateur- Satellite | Band identified for the possible introduction of vehicular collision avoidance radar |
| 119.98- 122.25GHz | | 122- 123GHz SRD unrestricted usage |
| 122.25- 123GHz | | 122- 123GHz ISM |
| 123- 130GHz | Fixed Mobile | 122- 123GHz |
| 241- 248GHz | Radio Location Amateur Amateur- Satellite | 241- 248GHz amateur usage 244- 246GHz SRD unrestricted usage and ISM usage |
| 248- 250GHz | Radio Location Amateur Amateur- Satellite | 248- 250GHz amateur usage |
| 250- 252GHz | Amateur Amateur- Satellite | |

| Abbreviation | Meaning |
|-----------------|--|
| (OR) | Off-route, used in conjunction with Aeronautical Mobile Service |
| (R) | En-route, used in conjunction with Aeronautical Mobile Service |
| AMPS | Advanced Mobile Phone System |
| Cospas – Sarsat | International Satellite System for Search and Rescue |
| DAMPS | Digital Advanced Mobile Phone System |
| DECT | Digital Enhanced Cordless Telecommunications |
| DGPS | Differential Global Positioning System used for correcting dithered GPS signals to improve accuracy. |
| DSC | Distress and Safety Calling |
| DTH | Direct to Home (reception), used in conjunction with the Fixed Satellite Service |
| EPIRB | Emergency Position Indicating Radio Beacon |
| FWA | Fixed Wireless Access |
| GMDSS | Global Maritime Distress and Safety System |
| GPS | Global Positioning System |
| GSM | Global System for Mobile communications |

| Abbreviation | Meaning |
|--------------|---|
| ILS | Instrument Landing System |
| IRR | International Radio Regulations |
| ISM | Industry, Scientific, and Medical |
| ITU | International Telecommunications Union |
| LMDS | Local Multipoint Distribution Service |
| MLS | Microwave Landing System |
| MR # | Management Right (the # signifies an integer identification number). |
| NDB(s) | Non-Directional Beacon(s) |
| PCS | Personal Communications System |
| PHS | Personal Handyphone System |
| PRS | Personal Radio Service |
| RADAR | Radio Detection And Ranging |
| RLAN | Radio Local Area Network |
| RRD(s) | Restricted Radiation Device(s), also known as Short Range Device(s) or SRD(s) |
| SAR | Search And Rescue |
| SRD(s) | Short Range Device(s), also known as Restricted Radiation Device(s) or RRD(s) |
| VSAT | Very Small Aperture Terminals |

COAXIAL PLUG ASSEMBLY

BNC Type (Female)



Step 1:
Cut end of cable evenly and remove 8 mm of outer sheath.



Step 2:
Slide clamp nut and pressure sleeve over cable, and comb out braid.



Step 3:
Fold braid back and insert ferrule between braid and dielectric. Trim off excess braid.



Step 4:
Remove 5 mm of dielectric without damaging centre conductor. Tin conductor.



Step 5:
Slide rear insulator over conductor hard against rear insulator. Solder contact to conductor.



Step 6:
Fit front insulator in body and push sub-assembly onto body. Slide pressure sleeve into body and screw in the clamp nut to clamp cable.



BNC Type (Male)



Step 1:
Cut end of cable evenly, and remove 7 mm of outer sheath.



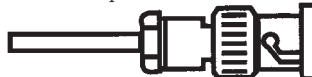
Step 2:
Slide clamp-nut, washer and rubber spacer over cable. Slide pressure sleeve over braid, and fan out braid.



Step 3:
Fold back braid against pressure sleeve and trim off excess. Strip 4 mm of inside insulation off centre wire. Solder pin onto centre wire.



Step 4:
Fit assembly, pin first, into main receptacle. Push washer, rubber spacer and clamp nut up and screw into place.



"N" Type



Step 1:
Cut end of cable evenly and remove 9 mm of outer sheath.



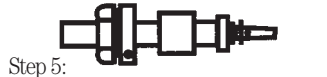
Step 2:
Slide clamp nut and pressure sleeve over cable, and comb out braid.



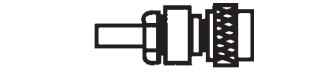
Step 3:
Fold braid back and insert ferrule between braid and dielectric. Trim off excess braid and remove 5.5 mm dielectric without damaging inner conductor. Tin end of conductor.



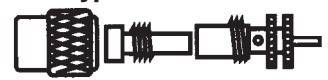
Step 4:
Slide rear insulator over conductor and position against end of dielectric. Slide contact over conductor until hard against rear insulator. Solder contact to conductor.



Step 5:
Fit front insulator in body and push sub-assembly into body. Slide pressure sleeve into body and screw in the clamp nut to clamp cable.



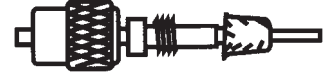
UHF Type



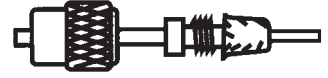
Step 1:
Cut end of cable evenly and remove 27 mm of outer sheath.



Step 2:
Slide coupling ring and adaptor onto sheath. Fan braid back over sheath.



Step 3:
Compress braid around cable and position adaptor so braid fans over adaptor. Trim off excess braid.



Step 4:
Remove 12.5 mm dielectric and tin conductor. Screw the plug assembly onto cable and solder plug to braid through solder holes.



Step 5:
Solder conductor to centre pin and screw coupling ring onto assembly.



COAXIAL CABLE SPECIFICATIONS

| Type | Nom. Imp Zo | Outer Dia (mm) | Nominal Attenuation (dB/100 m) | | | | | Vel Factor % | Cap pF/m | Volts Vrms |
|-----------|----------------|-------------------|--------------------------------|------------|------------|------------|----------|-----------------|-------------|---------------|
| | | | 50 MHz | 100 MHz | 200 MHz | 400 MHz | 1 GHz | | | |
| RG-8/U | 52 | 10.3 | 5.2 | 7.2 | 10.5 | 15.4 | 29.2 | 66.0 | 96.8 | 5000 |
| RG-9/U | 51 | 10.67 | 5.2 | 7.2 | 10.5 | 15.4 | 29.2 | 66.0 | 67.3 | 5000 |
| RG-11/U | 75 | 10.29 | 4.3 | 6.6 | 9.5 | 13.8 | 22.3 | 66.0 | 67.3 | 5000 |
| RG-58/U | 53.5 | 4.95 | 10.2 | 14.8 | 22.3 | 32.8 | 55.8 | 66.0 | 93.5 | 1900 |
| RG-58A/U | 50 | 4.95 | 10.8 | 16.1 | 23.9 | 37.7 | 70.5 | 66.0 | 101.0 | 1900 |
| RG-58C/U | 50 | 4.95 | 10.8 | 16.1 | 23.9 | 37.7 | 70.5 | 66.0 | 101.0 | 1900 |
| RG-59/U | 73 | 6.15 | 7.9 | 11.2 | 16.1 | 23.3 | 39.4 | 66.0 | 68.9 | 2300 |
| RG-59B/U | 75 | 6.15 | 7.9 | 11.2 | 16.1 | 23.0 | 39.4 | 66.0 | 67.3 | 2300 |
| RG-62/U | 93 | 6.04 | 6.2 | 8.9 | 12.5 | 17.7 | 28.5 | 84.0 | 44.3 | 700 |
| RG-62B/U | 93 | 6.15 | 6.6 | 9.5 | 13.8 | 20.0 | 36.1 | 84.0 | 44.3 | 700 |
| RG-122/U | 50 | 4.06 | 14.8 | 23.0 | 32.8 | 49.9 | 87.0 | 66.0 | 101.0 | 1900 |
| RG-141A/U | 50 | 4.06 | 6.9 | 10.5 | 15.4 | 22.6 | 41.7 | 69.5 | 95.1 | 1900 |
| RG-142B/U | 50 | 4.95 | 8.9 | 12.8 | 18.4 | 26.9 | 44.3 | 69.5 | 95.2 | 1900 |
| RG-174/U | 50 | 2.56 | 21.7 | 29.2 | 39.4 | 57.4 | 98.4 | 66.0 | 101.0 | 1500 |
| RG-178B/U | 50 | 1.83 | 34.4 | 45.9 | 62.3 | 91.9 | 150.9 | 69.5 | 95.1 | 1000 |
| RG-178B/U | 75 | 2.54 | 27.9 | 32.8 | 41.0 | 52.5 | 78.7 | 69.5 | 64.0 | 1200 |
| RG-180B/U | 95 | 3.56 | 15.1 | 18.7 | 24.9 | 35.1 | 55.8 | 69.5 | 49.2 | 1500 |
| RG-187A/U | 75 | 2.66 | 37.9 | 32.8 | 41.0 | 52.5 | 78.7 | 69.5 | 64.0 | 1200 |
| RG-188A/U | 50 | 2.59 | 31.5 | 37.4 | 46.6 | 54.8 | 101.7 | 69.5 | 95.2 | 1200 |
| RG-196A/U | 50 | 1.93 | 34.4 | 45.9 | 62.3 | 91.9 | 150.9 | 95.2 | 1200 | |
| RG-213/U | 50 | 10.29 | 5.2 | 7.2 | 10.5 | 15.4 | 29.2 | 66.0 | 101.0 | 5000 |
| RG-214/U | 50 | 10.8 | 5.2 | 7.2 | 10.5 | 15.4 | 29.2 | 66.0 | 101.0 | 5000 |
| RG-223/U | 50 | 5.38 | 10.1 | 14.8 | 21.0 | 30.2 | 63.5 | 66.0 | 101.0 | 1900 |
| RG-303/U | 50 | 4.31 | 6.9 | 10.5 | 15.4 | 22.6 | 42.7 | 69.5 | 95.2 | 1900 |
| RG-316/U | 50 | 2.49 | 30.8 | 34.1 | 43.3 | 54.1 | 101.7 | 69.5 | 95.2 | 1200 |
| BEL 9913 | 50 | 10.29 | 3.0 | 4.5 | 5.9 | 8.5 | 14.8 | 84.0 | 78.7 | — |

NB: Except for Belden 9913, all specifications are referenced to MIL-C-17D/F or JAN-C-17A as applicable.

COMMONLY USED SYMBOLS & ABBREVIATIONS

| A | |
|-------|---|
| A | ampere, amplification factor |
| AC | alternating current |
| A/D | analogue-to-digital |
| AF | audio frequency |
| afc | automatic frequency control |
| afsk | audio frequency shift keying |
| agc | automatic gain control |
| Ah | ampere hour |
| alc | automatic load (or level) control |
| AM | amplitude modulation |
| a.m. | morning |
| AMSAT | Radio Amateur Satellite Corporation |
| AMTOR | Amateur Teleprinting Over Radio |
| anl | automatic noise limiter |
| ant | antenna |
| AOS | acquisition of signal |
| ARA | Amateur Radio Association |
| ARC | Amateur Radio Club |
| AREC | Amateur Radio Emergency Corps |
| ARS | Amateur Radio Society; Amateur Radio Station |
| ASCII | American National Standard Code for Information Interchange |
| ATV | amateur television |
| avc | automatic volume control |
| AWG | American wire gauge |
| az-el | azimuth-elevation |

| B | |
|-------|--|
| B | flux density; susceptance |
| BASIC | Beginner's All-purpose Symbolic Instruction Code (computer language) |
| b | byte (a group of bits or binary digits, usually eight) |
| bc | broadcast |
| BCD | binary-coded-decimal |
| BCI | broadcast interference |
| bcl | broadcast listener |
| bd | baud (bits/sec) |
| ber | bit error rate |
| bit | binary digit |
| BFO | beat-frequency oscillator |
| bpf | band pass filter |
| bw | bandwidth |
| byte | computer word, 8 bits |

| C | |
|------|--|
| C | Celsius, capacity, Coulomb |
| c | velocity of EM waves |
| CATV | cable television |
| CB | citizens band |
| CCIR | International Radio Consultative Committee |
| CCIT | Consultative Committee for International Telegraph and Telephone (ITU) |
| CCS | constant current source |
| cctv | closed circuit television |
| ccw | coherent CW; counter-clockwise |
| CD | Civil Defence |
| Ch | channel |
| cm | centimetre |
| CMOS | (or COSMOS)—complimentary-symmetry metaloxide semiconductor |
| coax | coaxial cable or connector |
| COR | carrier-operated relay |
| CPU | central processing unit |
| CQ | general call to all stations |

| | |
|-------|--------------------------------------|
| CRT | cathode-ray tube |
| ct | centre tap |
| CTCSS | continuous tone coded squelch system |
| CW | continuous wave (code); clockwise |

| D | |
|------|--|
| D | electrostatic displacement; flux density |
| D/A | digital-to-analogue |
| dB | decibel |
| dBd | antenna gain referenced to a dipole |
| DBDM | double-balance diode mixer |
| dBi | antenna gain referenced to an isotropic, a dipole has a gain of 2.14 dBi |
| dBm | decibel referred to 1 milliwatt |
| dBW | decibel referred to 1 watt |
| DC | direct current |
| det | detector |
| DF | direction finder; direction finding |
| DIP | dual-in-line package, 14 to 16 pins |
| dpdt | double-pole double-throw |
| dpst | double-pole single-throw |
| dsb | double sideband |
| DTL | diode-transistor logic |
| DTMF | dual tone multi-frequency |
| DVM | digital voltmeter |
| DX | long distance |
| DXCC | DX Century Club |

| E | |
|-------|--|
| E | voltage |
| e | base of Napierian logs |
| ECL | emitter-coupled logic |
| ECO | electron-coupled oscillator |
| EHF | extra high frequency (30–300 GHz) |
| EHT | extra high tension |
| eirp | effective isotropic radiated power |
| EMC | electro-magnetic capability |
| E-M-E | earth-moon-earth (moonbounce) |
| emf | electromotive force (voltage) |
| EMI | electro-magnetic interference |
| EMP | electromagnetic pulse |
| EPRM | erasable programmable read-only memory |
| EUV | extreme ultra-violet radiation |
| EQX | equator crossing |
| erp | effective radiated power |

| F | |
|-------|---|
| f | frequency |
| F | farad; Fahrenheit |
| FAX | facsimile |
| FCC | Federal Communications Commission |
| FD | Field Day |
| FET | field-effect transistor |
| FF | flip-flop |
| FM | frequency modulation |
| FMT | frequency measuring test |
| FMTAG | Frequency Management Technical and Advisory Group |
| fot | optimum working frequency |
| fsd | full scale deflection |
| FSK | frequency-shift keying |

| G | |
|---|--------------------------|
| g | gram |
| G | giga (10 ⁹); |

| | |
|-----------------------------------|--|
| conductance; magneto motive force | |
| GaAs FET | gallium arsenide field-effect transistor |
| GDO | grid-dip or gate-dip oscillator |
| GHz | gigahertz |
| gnd | ground |
| GPRS | General Packet Radio Service |
| GPS | Global Positioning System |
| GSM | Globa System for Mobile Systems |

| H | |
|------|--|
| H | henry; magnetic field strength |
| HAAT | height above mean terrain |
| HF | high frequency (3–30 MHz) |
| HFO | heterodyne-frequency oscillator |
| hpf | highest possible frequency; high pass filter |
| HT | high tension |
| Hz | hertz |

| I | |
|------|---------------------------------------|
| I | current |
| IARU | International Amateur Radio Union |
| IC | integrated circuit |
| i-d | identification; identifier |
| ID | inside diameter |
| IF | intermediate frequency |
| IMD | inter-modulation distortion |
| I/O | input/output |
| IRC | international reply coupon |
| ISB | independent sideband |
| ITU | International Telecommunication Union |
| IW | Intruder Watch (Monitoring Service) |

| J | |
|------|--|
| J | Joule |
| j | indicator for reactive component of an impedance; (+j inductive; -j capacitive); joule |
| JFET | junction field-effect transistor |

| K | |
|-----|--|
| k | kilo (1000) |
| K | kilobyte; specific inductive capacity; Kelvin; dielectric constant |
| kg | kilogram |
| kHz | kilohertz (10 ³) |
| km | kilometre |
| kV | kilovolt |
| kW | kilowatt |
| kWh | kilowatt hour |

| L | |
|-------|---------------------------------------|
| L | self inductance |
| LC | inductance-capacitance |
| LCD | liquid crystal display |
| LED | light-emitting diode |
| LF | low frequency (30–300 kHz) |
| lhcp | left-hand circular polarisation |
| LO | local oscillator |
| loran | long-range navigation |
| LOS | loss of signal |
| lp | long periodic; long path |
| LSB | lower sideband; least significant bit |
| LSI | large-scale integration |
| LT | low tension |
| luf | lowest usable frequency |
| lw | longwave; long wire |

| M | | | | | |
|-----------|---|----------|--|----------|--|
| m | metre (distance or band); milli (10 ⁻³); mass | p.m. | afternoon/night | TE | trans-equatorial (propagation) |
| M | mega (10 ⁶); mutual inductance | PMOS | p-channel MOS | tfc | traffic |
| mA | milliampere (one-thousandth of an Amp) | pnp | positive-negative-positive | THz | tetrahertz (1012) |
| mA | milliampere (one-thousandth of an Amp) | ppi | plan position indicator (radar) | THD | total harmonic distortion |
| MAH | milliampere hour | pot | potentiometer | tpi | turns per inch |
| MARS | Military Affiliate Radio System | PROM | programmable read-only memory | T-R | transmit-receive |
| MATV | multi-access television | PRV | peak reverse voltage | TTL; T2L | transistor-transistor logic |
| MF | medium frequency (300–3000 kHz) | PSK | phase-shift keying | TTY | teletypewriter (from Teletype, the trade mark of Teletype Corporation) |
| mH | millihenry | PTO | permeability-tuned oscillator | TV | television |
| MHz | megahertz (106) | PTT | push-to-talk | TVI | television interference |
| mike; mic | microphone | PSU | power supply unit | Tx | transmitter |
| mini-DIP | dual-in-line package of 8 pins | Q | | U | |
| mi/h | miles per hour | Q | figure of merit (tuned circuits); charge; quantity | UHF | ultra-high frequency (300–3000 MHz) |
| mi/s | miles per second | QRP | low power (less than 10 watts input) | UJT | uni-junction transistor |
| mix | mixer | QTHR | address correct in <i>Call Book</i> | UoSAT | University of Surrey educational/research satellite (Great Britain) |
| mm | millimetre | R | | USB | upper sideband |
| MO | master oscillator | R | resistance | UTC | Universal Co-ordinated Time |
| MOS | metal oxide semiconductor | RAM | random access memory | uV | ultra-violet light |
| mod | modulator | R/C | radio control | V | |
| modem | modulator/demodulator | R-C | resistor-capacitor | V | volt; voltage |
| MOX | manually operated switching | rcvr | receiver | VA | Volt-Ampere |
| ms | millisecond | rev/min | revolutions per minute | VCO | voltage-controlled oscillator |
| m.s. | meteor scatter | RF | radio frequency | VCR | video cassette recorder |
| m/s | metres per second | RFC | radio-frequency choke | VCXO | voltage-controlled crystal oscillator |
| MSB | most significant bit | RFI | radio-frequency interference | VFBO | variable-frequency beat oscillator |
| MSI | medium-scale integration | rhcp | right-hand circular polarisation | VFO | variable frequency oscillator |
| MSTV | medium-scan television | RI | Radio Inspector | VHF | very-high frequency (30–300 MHz) |
| MUF | maximum usable frequency | RIT | receiver incremental tuning | VLSI | very large scale integration |
| MUX | multiplex; multiplexer | RLC | resistor, inductance, capacitor network | VOM | volt-ohm-milliammeter |
| mV | millivolt | rms | root-mean-square | VOX | voice-operated switching |
| mW | milliwatt | RO | Radio Officer | VR | voltage regulator |
| N | | ROM | read-only memory | VSWR | voltage standing-wave ratio |
| N | modulation factor | rprr | repeater | VTVM | vacuum-tube voltmeter |
| n | nano (10 ⁻⁹) | RS | Radiosport Satellite (USSR) | VU | volume unit |
| nbfm | narrow-band frequency modulation | RSGB | Radio Society of Great Britain | VXO | variable crystal oscillator |
| nbvm | narrow-band voice modulation | RST | readability-strength-tone | W | |
| n.c. | no connection | RT | radiotelephone | W | watt; work |
| NC | normally closed | RTL | resistor-transistor logic | WAC | Worked All Continents |
| NF | noise figure | RTTY | radioteletype | WARC | World Administrative Radio Conference |
| NiCad | nickel cadmium | Rx | receiver | WAS | Worked All States |
| NL | noise limiter | S | | wbfm | wide-band FM |
| NMOS | n-channel MOS | S | second; magnetic reluctance; Siemens | Wh | watt-hours |
| NO | normally open | SAE | self-addressed envelope | wpm | words per minute |
| nnp | negative-positive-negative | SASE | stamped SAE | ww | wire wound; wire wrap |
| nS | nanosecond | SCR | silicon-controlled rectifier | wx | weather |
| NZART | New Zealand Association of Radio Transmitters | SHF | super-high frequency (3–30 GHz) | X | |
| O | | SINAD | Ratio of Signal to Noise and Distortion | X | reactance; electrostatic field strength |
| OD | outside diameter | SM | silver mica (capacitor) | xcvr | transceiver |
| OM | old man | SNR; S/N | signal-to-noise ratio | XO | crystal oscillator |
| op amp | operational amplifier | spdt | single-pole double-throw | xfmr | transformer |
| osc | oscillator | spst | single-pole single-throw | xmtr | transmitter |
| OSCAR | Orbiting Satellite Carrying Amateur Radio | SS | sweepstakes; spread spectrum | xtal | crystal |
| OTC | Old Timers' Club | SSB | single sideband | XYL | wife |
| oz | ounce | SSC | AMSAT Phase III special service channels | Y | |
| P | | SSI | small-scale integration | Y | admittance |
| p | pico (10 ⁻¹²) | SSTV | slow-scan television | YF | wife |
| P | power | STSP | short-term special purpose (FM repeaters) | YL | young lady or lady operator |
| PA | power amplifier; public address system | SWL | shortwave listener | Z | |
| PAM | pulse amplitude modulation | SWR | standing-wave ratio | Z | impedance; UTC time |
| PCB | printed (or etched) circuit board | sync | synchronous; synchronising | | |
| PCM | pulse code modulation | SYNCART | synchronous satellite carrying Amateur Radio Transponder | | |
| PEP | peak envelope power | T | | | |
| pF | picofarad | t | time; temperature C | | |
| ph | phone | T | period; temperature K | | |
| PIN | positive intrinsic negative | TA | technical adviser | | |
| PIV | peak inverse voltage | TCA | time of closest approach | | |
| pk | peak | | | | |
| pk-pk | peak to peak | | | | |
| PLL | phase-locked loop | | | | |
| PM | phase modulation | | | | |

Conversion Factors (Metric-Imperial)

| | |
|---|--|
| 1 millimetre (mm) | = 0.03937 inch |
| 1 centimetre (cm) = 10mm | = 0.3937 inch |
| 1 metre (m) = 100cm | = 39.37 inches, 3.28 feet, 1.094 yards |
| 1 kilometre (km) = 1000m | = 3280.8 feet, 1094 yards, 0.621 miles |
| 1 gram (g) = 1000mg | = 0.03574 ounces |
| 1 kilogram (kg) = 1000g | = 2.2046 pounds |
| 1 tonne (t) = 1000kg | = 0.98 ton, 2204.6 pounds |
| 1 cubic centimetre (cm ³) = 1000mm ³ | = 0.6102 cubic inches |
| 1 cubic metre (m ³) | = 35.3 cubic feet, 1.3 cubic yards |
| 1 litre (l) | = 0.220 imperial gallons, 0.264 US gallons |
| 1 kilopascal (kPa) | = 0.145 lbs/sq. inch, 0.009867 atmospheres |
| 1 kilojoule (kJ) | = 0.948 BTU, 0.239 kilocalories, 737.56ft/lb |
| 1 kilowatt (kW) | = 1.34 horsepower, 73.7ft.lb/sec |
| 1 Newton (N) | = 0.2248lb force |
| 1 Tesla (T) | = 10,000 gauss |
| 1 Weber (W) | = 10 ⁸ Maxwell |

Prefixes for Multiples and Sub-multiples of Quantities

| Multiple or Sub-multiple | Name | Prefix |
|--------------------------|--------|--------|
| 10 ¹² | Tera | T |
| 10 ⁹ | Giga- | G |
| 10 ⁶ | Mega- | M |
| 10 ³ | Kilo- | k |
| 10 ² | Hecto | h |
| 10 | Deca | da |
| 10 ⁻¹ | Deci | d |
| 10 ⁻² | Centi- | c |
| 10 ⁻³ | Milli- | m |
| 10 ⁻⁶ | Micro- | μ |
| 10 ⁻⁹ | Nano- | n |
| 10 ⁻¹² | Pico- | p |
| 10 ⁻¹⁵ | Femto | f |
| 10 ⁻¹⁸ | Atto- | a |

Preferred Number Series

| | | | | | | | | | | | | |
|-----------------------|----|----|----|----|----|----|----|----|----|----|----|----|
| (a) 10% Tolerance E12 | 10 | 12 | 15 | 18 | 22 | 27 | 33 | 39 | 47 | 56 | 68 | 82 |
| (b) 5% Tolerance E24 | 10 | 11 | 12 | 13 | 15 | 16 | 18 | 20 | 22 | 24 | 27 | 30 |
| | 33 | 36 | 39 | 43 | 47 | 51 | 56 | 62 | 68 | 75 | 82 | 91 |

DC resistance of conducting materials relative to copper

| Material | Resistance Ratio | Material | Resistance Ratio |
|-----------|------------------|-----------------|------------------|
| Aluminium | 1.6 | Nichrome | 63.0 |
| Brass | 3.8 | Nickel | 4.1 |
| Cadmium | 4.1 | Phosphor Bronze | 6.7 |
| Chromium | 12.0 | Platinum | 6.4 |
| Copper | 1.0 | Silver | 0.97 |
| Gold | 1.4 | Stainless Steel | 43.0 |
| Iron | 5.9 | Tin | 6.6 |
| Lead | 12.0 | Zinc | 3.6 |

Useful Formulae

- Wavelength (in metres)
Free space = $300/f(\text{MHz})$
Half-wave wire dipole = $143/f(\text{MHz})$
- Resonant frequency of an LC circuit
 $f = 0.159155/\sqrt{LC}$
- The quality factor or Q of a circuit at resonance is
 $Q = 2\pi f L/r$
- The 3 dB bandwidth of such a single tuned circuit
 $B = f(\text{res})/Q$
- Estimate of transformer rating
Output = $31 A^2 \text{ Watts}$
where A = core cross-section in sq.ins.
or Output = $4.8 A^2 \text{ Watts}$ if A is in sq.cm.

Ohms Law

$$V = IR = W/I = \sqrt{WR}$$

$$I = V/R = W/V = \sqrt{W/R}$$

$$R = V/I = V^2/W = W/I^2$$

$$W = VI = I^2 R = V^2/R$$

Mains Plug Wiring

| | | |
|---------|--------------|-------|
| Phase | Brown | Red |
| Neutral | Blue | Black |
| Earth | Green/Yellow | Green |

Average, Peak, RMS Values

| | Multiplication factor for sine wave | | | |
|-----------|-------------------------------------|--------|-------|-----------|
| | Average | RMS | Peak | Peak-Peak |
| Average | — | 1.1133 | 1.573 | 3.143 |
| RMS | 0.933 | — | 1.414 | 2.828 |
| Peak | 0.637 | 0.7073 | — | 2.033 |
| Peak-Peak | 0.323 | 0.3535 | 0.533 | — |

Colour Codes

Tantalum Capacitors

Top/Middle band: Value in μF (2 digits)

Middle Spot: Multiplier

Bottom band: Maximum voltage

| Colour | Value | Multiplier | Voltage |
|--------|-------|----------------------|---------|
| Black | 0 | $\times 1$ | 10.0 |
| Brown | 1 | $\times 10$ | 1.6 |
| Red | 2 | $\times 100$ | 0.4 |
| Orange | 3 | $\times 1\text{k}$ | 40.0 |
| Yellow | 4 | $\times 10\text{k}$ | 6.3 |
| Green | 5 | $\times 100\text{k}$ | 16.0 |
| Blue | 6 | | 20.0 |
| Violet | 7 | $\times 0.0001$ | |
| Grey | 8 | $\times 0.01$ | 25.0 |
| White | 9 | $\times 0.1$ | 2.5 |

Capacitors

Top band: First digit of value

Second band: Second digit of value (gives value in pF)

Third band: Multiplier

Fourth band: Tolerance—White 10%, Black 20%

Bottom Band: Voltage

Resistors

Bands from closest to lead:

First digit of value

Second digit of value

Multiplier

Tolerance

| Colour | Value | Multiplier | Tolerance |
|---------|-------|-----------------------|-----------|
| Black | 0 | $\times 1$ | |
| Brown | 1 | $\times 10$ | 1% |
| Red | 2 | $\times 100$ | 2% |
| Orange | 3 | $\times 1\text{ k}$ | |
| Yellow | 4 | $\times 10\text{ k}$ | |
| Green | 5 | $\times 100\text{ k}$ | |
| Blue | 6 | $\times 1\text{ M}$ | |
| Violet | 7 | $\times 10\text{ M}$ | |
| Grey | 8 | | |
| White | 9 | | |
| Gold | | | 5% |
| Silver | | | 10% |
| No band | | | 20% |

Notes

- 1% tolerance resistors have five bands. The first three give three digits of value, the rest as above.
- Bands are closer to one end of the resistor. Read bands in sequence from this end.

Hexadecimal Constants

| Hex Code | Most Significant Bytes | | Least Significant Bytes | |
|----------|------------------------|------|-------------------------|----|
| 0 | 0 | 0 | 0 | 0 |
| 1 | 4096 | 256 | 16 | 1 |
| 2 | 8192 | 512 | 32 | 2 |
| 3 | 12288 | 768 | 48 | 3 |
| 4 | 16384 | 1024 | 64 | 4 |
| 5 | 20480 | 1280 | 80 | 5 |
| 6 | 24567 | 1536 | 96 | 6 |
| 7 | 28672 | 1792 | 112 | 7 |
| 8 | 32768 | 2048 | 128 | 8 |
| 9 | 36864 | 2304 | 144 | 9 |
| A | 40960 | 2560 | 160 | 10 |
| B | 45056 | 2816 | 176 | 11 |
| C | 49152 | 3072 | 192 | 12 |
| D | 53348 | 3328 | 208 | 13 |
| E | 57344 | 3584 | 224 | 14 |
| F | 61440 | 3840 | 240 | 15 |

HEX TO DECIMAL CONVERSION

Decimal Value = IV + III + II + I

ASCII Character Codes as defined in ANSI X3.4

| Dec | Hex | Char | Dec | Hex | Char | Dec | Hex | Char | Dec | Hex | Char |
|-----|-----|------|-----|-----|-------|-----|-----|------|-----|-----|------|
| 0 | 0 | NUL | 32 | 20 | SPACE | 64 | 40 | @ | 96 | 60 | — |
| 1 | 1 | SOH | 33 | 24 | ! | 65 | 41 | A | 97 | 61 | a |
| 2 | 2 | STX | 34 | 22 | “ | 66 | 42 | B | 98 | 63 | b |
| 3 | 3 | ETX | 35 | 34 | # | 67 | 43 | C | 99 | 63 | c |
| 4 | 4 | EOT | 36 | 24 | \$ | 68 | 44 | D | 100 | 64 | d |
| 5 | 5 | ENQ | 37 | 25 | % | 69 | 45 | E | 101 | 65 | e |
| 6 | 6 | ACK | 38 | 26 | & | 70 | 46 | F | 102 | 66 | f |
| 7 | 7 | BEL | 39 | 27 | ‘ | 71 | 47 | G | 103 | 67 | g |
| 8 | 8 | BS | 40 | 28 | (| 72 | 48 | H | 104 | 68 | h |
| 9 | 9 | HT | 41 | 29 |) | 73 | 49 | I | 105 | 69 | i |
| 10 | A | LF | 42 | 2A | * | 74 | 4A | J | 106 | 6A | j |
| 11 | B | VT | 43 | 2B | + | 75 | 4B | K | 107 | 6B | k |
| 12 | C | FF | 44 | 2C | , | 76 | 4C | L | 108 | 6C | l |
| 13 | D | CR | 45 | 2D | - | 77 | 4D | M | 109 | 6D | m |
| 14 | E | SO | 46 | 2E | . | 78 | 4E | N | 110 | 6E | n |
| 15 | F | SI | 47 | 2F | / | 79 | 4F | O | 111 | 6F | o |
| 16 | 10 | DLE | 48 | 30 | 0 | 80 | 50 | P | 112 | 70 | p |
| 17 | 11 | DC1 | 49 | 31 | 1 | 81 | 51 | Q | 113 | 71 | q |
| 18 | 12 | DC2 | 50 | 32 | 2 | 82 | 52 | R | 114 | 72 | r |
| 19 | 13 | DC3 | 51 | 33 | 3 | 83 | 53 | S | 115 | 73 | s |
| 20 | 14 | DC4 | 52 | 34 | 4 | 84 | 54 | T | 116 | 74 | t |
| 21 | 15 | NAK | 53 | 35 | 5 | 85 | 55 | U | 117 | 75 | u |
| 22 | 16 | SYN | 54 | 36 | 6 | 86 | 56 | V | 118 | 76 | v |
| 23 | 17 | ETB | 55 | 37 | 7 | 87 | 57 | W | 119 | 77 | w |
| 24 | 18 | CAN | 56 | 38 | 8 | 88 | 58 | X | 120 | 78 | x |
| 25 | 19 | EM | 57 | 39 | 9 | 89 | 59 | Y | 121 | 79 | y |
| 26 | 1A | SUB | 58 | 3A | : | 90 | 5A | Z | 122 | 7A | z |
| 27 | 1B | ESC | 59 | 3B | ; | 91 | 5B | [| 123 | 7B | { |
| 28 | 1C | FS | 60 | 3C | < | 92 | 5C | \ | 124 | 7C | |
| 29 | 1D | GS | 61 | 3D | = | 93 | 5D |] | 125 | 7D | } |
| 30 | 1E | RS | 62 | 3E | > | 94 | 5E | → | 126 | 7E | — |
| 31 | 1F | US | 63 | 3F | ? | 95 | 5F | _ | 127 | 7F | DEL |

ASCII Control Codes

| | |
|----------------------------------|--|
| NUL (Ctrl @) Null | DLE (Ctrl P) Data Link Escape |
| SOH (Ctrl A) Start of Heading | DC1 (Ctrl Q) Device Control 1 |
| STX (Ctrl B) Start of Text | DC2 (Ctrl R) Device Control 2 |
| ETX (Ctrl C) End of Text | DC3 (Ctrl S) Device Control 3 |
| EOT (Ctrl D) End of Transmission | DC4 (Ctrl T) Device Control 4 |
| ENQ (Ctrl E) Enquiry | NAK (Ctrl U) Negative Acknowledge |
| ACK (Ctrl F) Acknowledge | SYN (Ctrl V) Synchronous Idle |
| BEL (Ctrl G) Bell | ETB (Ctrl W) End of Transmission Block |
| BS (Ctrl H) Back Space | CAN (Ctrl X) Cancel |
| HT (Ctrl I) Horizontal Tab | EM (Ctrl Y) End of Medium |
| LF (Ctrl j) Line Feed | SUB (Ctrl Z) Substitute |
| VT (Ctrl K) Vertical Tab | ESC (Ctrl j) Escape |
| FF (Ctrl L) Form Feed | FS (Ctrl \) File Separator |
| CR (Ctrl M) Carriage Return | GS (Ctrl j) Group Separator |
| SO (Ctrl N) Shift Our | RS (Ctrl ^) Record Separator |
| SI (Ctrl O) Shift In | US (Ctrl _) Unit Separator |

The RS-232C Interface

The basic RS-232C Electrical specifications

Communication rate:

0–20,000 bits per second

Driver output voltage levels, maximum no load:

–25 V logic 1, + 25 V logic 0

Driver output voltage ranges for loads between 3 k and 7 k

Ohms:

Logic 1: –15 V (7 k) and –5 V (3 k)

Logic 0: + 15 V (7 k) and + 5 V (3 k)

Driver output current, short circuit:

500 mA maximum

Driver output impedance with power off:

300 Ω minimum

Maximum driver output slew rate:

30 V per microsecond

Receiver input resistance:

7 k Ω maximum

3 k Ω minimum

Effective receiver input capacitance:

2500 pF maximum

Maximum receiver input voltage range:

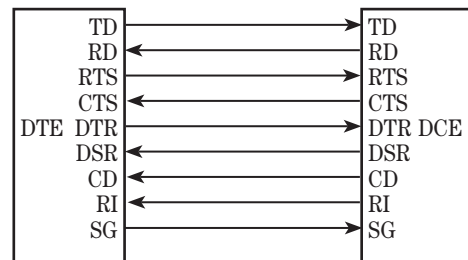
– 25 V to + 25 V

The following table shows the nine most common signals used for serial communications and their PIN allocations for nine and 25 PIN connectors:

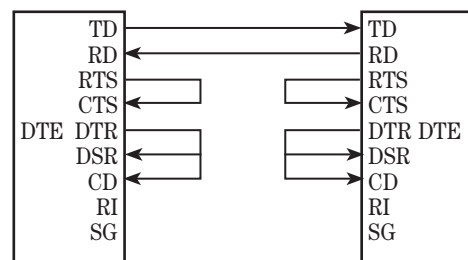
| Signal | PIN No. (9 pin) | PIN No. (25 pin) |
|--------|--------------------|---------------------|
| TD | 3 | 2 |
| RD | 2 | 3 |
| RTS | 7 | 4 |
| CTS | 8 | 5 |
| DSR | 6 | 6 |
| SG | 5 | 7 |
| CD | 1 | 8 |
| DTR | 4 | 20 |
| RI | 9 | 22 |

Common RS-232C Connections

Each signal (except ground) is either an input or an output depending whether it is on the Data Terminal Equipment (DTE) (eg, a computer terminal) or the Data Circuit Terminating Equipment (DCE) (eg, a modem). A typical connection is shown below.



When two computer terminals (DTEs) are connected together, a “null modem” hook-up is needed to fool each DTE into thinking that it is connected to DCE. A typical null modem connection is shown below.



BASIC & DERIVED SI UNITS – CONVERSION FACTORS

Basic SI Units

| Quantity | Name of unit | Unit symbol |
|---------------------------|---------------|-------------|
| Electric current | ampere | A |
| Length | metre | m |
| Luminous intensity | candela | cd |
| Mass | kilogramme | kg |
| Thermodynamic temperature | degree Kelvin | °K |
| Time | second | s |

Derived SI Units

| Physical quantity | SI unit | Unit symbol |
|-------------------------------|---------|-------------------------|
| Electric capacitance | farad | F = A s/V |
| Electrical charge | coulomb | C = A s |
| Electrical potential | volt | V = W/A |
| Electric resistance | Ohms | Ω = V/A |
| Force | Newton | N = kg m/s ² |
| Frequency | Hertz* | Hz = s ⁻¹ |
| Illumination | lux | lx = lm/m ² |
| Inductance | Henry | H = V s/A |
| Luminous flux | lumen | lm = cd sr |
| Magnetic flux | Weber | Wb = V s |
| Magnetic flux density | Tesla† | T = Wb/m ² |
| Power | Watt | W = J/s |
| Work energy, quantity of heat | joule | J = N m |

*Hertz is equivalent to cycle per second.

†Tesla is equivalent to Weber per square metre.

Conversion factors

| To convert | into | Multiply by | Conversely |
|------------------|-------------------|---|---|
| Amp hours | Coulombs | 3600 | 2.778×10^{-4} |
| Atmospheres | Lb/sq.in | 14.70 | 0.068 |
| Centigrade | Kelvin | $^{\circ}\text{C} + 273 = ^{\circ}\text{K}$ | $^{\circ}\text{K} - 273 = ^{\circ}\text{C}$ |
| Cubic inches | Cubic feet | 5.787×10^{-4} | 1728 |
| Cubic inches | Cubic metres | 1.639×10^{-5} | 6.102×10^4 |
| Degrees | Radians | 1.754×10^{-2} | 57.3 |
| Dynes | Pounds | 2.248×10^{-6} | 4.448×10^5 |
| Ergs | Foot pounds | 7.376×10^{-8} | 1.356×10^7 |
| Feet | Centimetres | 30.48 | 3.281×10^{-2} |
| Foot pounds | Kilowatt hours | 3.766×10^{-7} | 2.655×10^6 |
| Gausses | Lines per sq.in. | 6.452 | 0.155 |
| Grams | Dynes | 980.7 | 1.02×10^{-3} |
| Grams per cm | Pounds per in | 5.6×10^{-3} | 178.6 |
| Horsepower | Kilowatts | 0.746 | 1.341 |
| Inches | Centimetres | 2.54 | 0.3937 |
| Kilograms | Pounds (lb) | 2.205 | 0.454 |
| Kilometres | Feet | 3281 | 3.048×10^{-4} |
| Kilometres | Nautical miles | 0.540 | 1.853 |
| Kilometres | Statute miles | 0.621 | 1.609 |
| Kilowatt hours | Joules | 3.6×10^6 | 2.778×10^{-7} |
| Kilowatt hours | HP hours | 1.341 | 0.7457 |
| Knots | Miles per hour | 1.1508 | 0.869 |
| Lamberts | Candles per sq.cm | 0.3183 | 3.142 |
| Lamberts | Candles per sq.in | 2.054 | 0.4869 |
| Lumens per sq.ft | Foot candles | 1 | 1 |
| Lux | Foot candles | 0.092892 | 10.764 |
| Metres | Feet | 3.28 | 10.764 |
| Metres | Yards | 1.094 | 0.9144 |
| Miles per hour | Feet per second | 1.467 | 0.68182 |
| Nepers | Decibels | 8.686 | 0.1151 |
| Tons | Pounds | 2240 | 4.464×10^{-4} |
| Watts | Ergs per second | 10^7 | 10^{-7} |

OLD TIMERS CLUB

by Roy Symon
ZL2KH

The objects of the Old Timers' Club (ZL) are set out in our Constitution adopted in 1993. They are as follows:

1. To recognise service to Amateur Radio;
2. To revive and maintain interests and good fellowship among the older members in the common cause.
3. To offer advice and encouragement to newer Amateurs.

The Club is affiliated to the New Zealand Association of Radio Transmitters (Inc).

The Annual General Meeting is held on the Sunday morning of Queen's Birthday weekend (in conjunction with the NZART Conference).

Grand Old Man: Ivan Horn, ZL2ATU, *Secretary/ Treasurer:* Roy Symon, ZL2KH, *Postal Address:* OTC, 25 Annandale St, New Plymouth 4310, *Phone:* 06-758-2156, *E-mail:* zl2kh@xtra.

co.nz

Roy can also be contacted during the OTC Net on 3.870 MHz.

Any material for the Break-In page should be sent to: ZL2KH, 25 Annandale St, New Plymouth.

Net Controllers:

Roy Symon ZL2KH

Don Dalrymple ZL3SZ

Stuart Watchman ZL2TW

Pete Moore ZL2AUB

80 m AM Phone—Doug Alexander ZL2AWF

District Representatives:

Tom Spackman ZL1WW, Don

Dalrymple ZL3SZ, Stuart

Watchman ZL2TW, Peter

Anderson ZL1LR,

OTC Scribe: Roy Symon ZL2KH.

A National Single Side-band Net is held every Monday evening at 2030 hrs (local time). The callsign is ZL6OTC. The frequency is 3.870 MHz. An AM Net is also run on Sunday morning at 10.30 am on 3.850 MHz. The Secretary gives

the Club News during the SSB Net.

Full membership is available to any holder of a ZL callsign who has held an amateur licence for the last 25 years or more and is still an active amateur.

In addition, Associate Membership is available to any ZL amateur who has attained the age of 60 years (and over) and has been an active amateur for 10 or more years. Voting privileges are not available to Associate Members. Application Forms for membership may be obtained from a District Representative, from the National Secretary, or can be downloaded from the NZART web page: www.nzart.org.nz. A joining fee of \$10.00 is payable on application.

Evidence of eligibility which is to be submitted shall include, full name, present callsign, original call, operator's certificate number and date of original licence. All

applications for membership shall be proposed and seconded by present OTC members.

On acceptance, a Certificate is issued to all Full and Associate Members, and they will be listed in the Blue Book.

All members of OTC are eligible to wear the Peacock Blue NZART Badge with callsign so long as they are financial members of NZART. This badge is available from NZART HQ at the current price of the similar black membership badges.

Handsome certificates are sent automatically to those who attain 50, 60 and 70 years of Amateur Service articles relating to all aspects of OTC or of vintage radio for publication in the OTC section of Break-In are welcomed by, and should be addressed to our Scribe, Roy Symon ZL2KH, 25 Annandale St, New Plymouth.

JAMBOREE ON AIR

by Jim Parnell
ZL2APE

JOTA is an annual event in which about 500,000 Scouts and Guides in countries all over the world make contact with each other by means of amateur radio. It is a real Jamboree during which Scouting and Guiding experiences are exchanged and ideas are shared, thus enhancing worldwide Scouting and Guiding. JOTA has been held annually since 1958 and Scouts and Guides are encouraged each year to invite radio amateurs to help them take part.

There are great potential benefits to amateur radio by encouraging young people to take part in JOTA as it introduces them to the hobby that you as an amateur enjoy. So it is in the interests of New Zealand amateurs to anticipate invitations by Scouts and Guides and also to approach their leaders, offering services and equipment.

The easiest way for Scouts and Guides to take part in JOTA is for them to visit an amateur station sometime during the JOTA period. At the station, the amateur establishes a contact with another amateur station and then

hands over the microphone to the Scouts and/or Guides. Satellite, Packet, SSTV and other modes of communication (including e-mail) are now used for JOTA as well as the normal modes using HF and VHF/UHF. Many stations are set up at Scout

or Guide Headquarters or at some local "interesting" or appropriate venue. Often, JOTA stations are set up at camps, the radio activities being incorporated into the camping programme. JOTA is now run concurrently with the Jamboree on the Internet



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(JOTI), the JOTA and JOTI stations being often combined on the same site. There is much information about JOTA and JOTI on the New Zealand Scouting web pages: <www.scouts.org.nz>, on the world scout JOTA web pages: <www.scout.org/jota> and <www.scout.org/joti>. Also on <www.jimparnell.co.nz/jota/jota.html> and <www.jimparnell.co.nz/joti/joti.html>.

JOTA and JOTI are both co-ordinated by the World Scout Bureau and organised by National Organisers in each Scouting and Guiding country.

JOTA and JOTI are always held during the 48 hours (local time) of the third full weekend in October. Sometimes this weekend is followed by Labour Day (4th Monday in October) and sometimes not.

In the year 2010, JOTA will be held on October 16 and 17. This is not the Labour Day Weekend.

Jim Parnell, ZL2APE

E-mail: jim-p@ihug.co.nz

National Organiser for JOTA and JOTI in New Zealand.

FISTS DOWN UNDER

by Ralph Sutton
ZL2AOH

New Zealand and Australia

FISTS Down Under is the New Zealand and Australian chapter of the FISTS Club, (International Morse Preservation Society) is one where veteran operators help newcomers and less-experienced operators learn and improve CW proficiency. The membership has grown from 300 in its first year of operation to over 5,550 members worldwide. It is one of amateur radio's fastest growing amateur radio organisations.

FISTS Down Under was formed in 1998 with Ralph Sutton ZL2AOH as the New Zealand/Australian coordinator. Membership now stands at over 150.

FISTS supports the use of Morse code

The membership comprises existing and prospective Morse operators and others who support our aims, including short-wave listeners.

We have three straightforward goals:

- Further the use of CW
- Engender friendships among members
- Encourage newcomers to use CW

Brought together by a common love of Morse, FISTS members actively participate in a wide variety of amateur radio activities including nets, rag chewing, earning awards, QRP, contesting and of course "Elmering." All activities include both slow and higher speeds and emphasise courteous operating practices.

FISTS Club membership

FISTS members are young, old, both OMs and YLs—they live all over the world including every State in the USA and all enjoy CW communications at widely varying proficiency levels.

FISTS is not tied to any commercial interests and has no paid employees. VK and ZL members receive "FISTS Down Under, our local monthly newsletter, as well as the UK produced newsletter Key Note and "MorseEAsia" the newsletter of the East Asia" chapter. All activities are funded from annual fees of \$15.00 (spouses and dependants of existing members can join at no cost).

Requirements for membership of the FISTS Club are very simple. One simply has to like Morse

code! You do not need to be a member of any other organisation and there is no minimum Morse proficiency requirement. You don't even have to be a licensed amateur.

FISTS QSL Bureaus

FISTS operates bureaus in the USA, UK, East Asia and Australia for the quick exchange of QSL cards between members. This is a no-cost service to members.

FISTS contests

FISTS occasionally conducts contests for members and others

FISTS awards

FISTS members participate between themselves in a popular award scheme that includes the following:

- Century award is for 100 FISTS contact points
- Platinum Award is for 100 Century Award contacts
- 250 Century award is for 250 Century Award holder contacts
- 500 Century Award is for 500 Century Award holder

contacts

- Silver Award is for 250 FISTS contact points
 - Gold Award is for 500 FISTS contact points
 - Diamond Award is for 1000 FISTS contact points
- Worked FISTS all US States—for exchange between FISTS members in QRP as well as QRO categories.

Affiliation

FISTS Down Under is affiliated to WIA (Wireless Institute of Australia and NZART (New Zealand Association of Radio Transmitters.)

Membership and other inquiries

Ralph Sutton ZL2AOH

12c Herbert Gardens

186 The Terrace

Wellington 6011

Telephone: (04) 473-0847

Fax: (04) 473-0848

E-mail: <fists-downunder@ihug.co.nz>

Web: <<http://www.fistsdownunder.org>>

ZL3 RADIO BUILDATHON PROJECT

By David W Searle ZL3DWS

Educating And Mentoring Tomorrows Technologists And Communicators

Since 2008, six ZL3 Radio Buildathons have been held in Christchurch. Hams from Branches 05, 56, 68 of NZART and others, have made it happen. In this article we'd like to share with you some ideas that could help you to run a successful Radio Buildathon. Many active amateur radio clubs will have run group kit building sessions for their members. The ZL3 events are a little different in that general members of the public are invited to come along. Radio amateurs mentor their progress and provide immediate help with issues.

Everyone's Invited

Ages can vary from 8 to 81 years, male and female, and can come from a wide variety of backgrounds and cultures. Many may not have seen a soldering iron before, let alone used one. You can imagine we faced some unusual early challenges and a steep learning curve. For example, don't underestimate how quickly 8-12 year olds learn, nor how well the fairer sex of any age can solder. I think I'll definitely contract out the soldering of my next kit!

Funding And Publicity

With funding from the

Christchurch City Council, three ZL3 Buildathons were held in quick succession during the July School holidays as part of KidsFest 2010. Some 70,000 kids aged 10-14 years from around Canterbury and beyond received an 82 page CCC KidsFest Guide setting out dozens and dozens of different activities they could enroll in. Our three events involving 57 kids, 20 hams as "mentors" plus numerous parents who decided to share the experience, were booked to overflowing by the end of the first week that bookings opened.

This article is based on meeting the demands of those three KidsFest events, plus three earlier but larger events. It includes a sprinkling of great ideas readily shared by helpful hams in the United Kingdom, South Africa and United States. We might be 12,000 miles away from Europe for example, but the "helpful ham spirit" still travels freely and well.

Why Hold A Buildathon?

The first consideration is why do you want to hold an event? A brain storming session with a small group of early supporters will assist greatly in this process. Here's a few possible objectives to consider: To let your local community know that Amateur Radio still exists? To build a team of enthusiasts who could help others gain their amateur radio licenses? To attract support from various parts of your



Nicky Wagner MP meets ZL3LD Christchurch's youngest radio amateur at ZL3 Radio Buildathon held on 8 July 2010.

community so that common goals are achieved? To generate some media attention that will result in more club members? Once these, and other questions are worked through, you can begin to build a list of objectives for your event.

Planning For Success

Having set your objectives the hard part starts. A plan. Who will do what, when, and where. It is also beneficial to create a budget. The funds available, or the lack of them, will quickly help you decide what is possible and what's not. At least for the first couple of events. Typical budget items include: venue hire, essential tools and test equipment, refreshments, work benches, mains cabling & extension boxes, RCD's, printed construction guides and most importantly the kit of parts.

Choosing A Kit Is An Art

The choice of what to build can make or break the success of your event. Carefully consider the following points: How old will the constructors be? How long will it typically take an average person to build the kit? How many parts are involved? What could go wrong during building? What is the cost of 10 or 50 kits? How many spares do you need? How do we present the kit to the builder? Have a sample or two of every kit under consideration built beforehand. You may be surprised how different people can assemble the same kit differently! There is a lot to consider and a lot to recommend the K.I.S.S. principle.



Tony ZL3HAM (centre) coaches careful construction of a ZL3 Buildathon radio

Form Of Construction

With regard to the kit chosen, there are a number of options around what form of construction to use. Common ones include: printed circuit board (with or without overlay) ugly bug (where parts are super glued to a copper board and soldered) or manhattan style (where parts are soldered on raised "lands" isolated from a copper board). Each have their benefits but you'll need to estimate the amount of time a builder will take on average, with the form of building you decide to use.

Construction Guide

The next most important factor to consider is the construction guide you will provide. This can be as simple as a page or two, or a mini book starting with an explanation of major components and the theory of how the circuit works. The age and experience of builders will influence the level of detail probably required. Get it right and the session will proceed smoothly. Get it wrong, and the total time taken may disappoint builders, and could affect the number of helpers who will join you for the next event!

Promotion And The Media

This isn't easy. Before the big day, telephone and/or email local newspapers and radio stations to let them know of your event. Posters in local venues (not just shops) may also be used to spread the word as well as advertise your Club meetings. Ask for publicity ideas at your club, among business colleagues and other groups you may belong to. There are a myriad of organisations that have "Community Notices" that could mention your event. Searching them out initially can

be time consuming, but it will get easier. And don't forget to tell NZART, "Break In" and the "Infoline" Editors.

On The Day

If possible, it could be most useful to set out the construction tables and equipment the night before. Lay out the mains cables, connect up the mains outlet boxes and test that the RCD's actually work. It's amazing what worked last time, has a habit of failing 10 minutes before the doors open, or you are short of a vital cable or connector. It happens. Everyone who comes along should sign in as a builder, mentor or parent. Pre-registration helps smooth this process and reduce queues. Name labels with call-signs helps everyone get to know each other quickly. Hams not seen for months at the clubrooms can turn up unexpectedly to lend an appreciative hand. So can lapsed license holders and non club members. It's a great opportunity to welcome them and encourage them to come along to the next club meeting.

Health And Safety Briefing

The importance of this aspect of your event cannot be overstated. During one ZL3 event the fire alarm did go off. About five times! The hall of 40 plus people was cleared in under a minute. We didn't know until later that it was a test. It was a very valuable lesson. Some venues available for hire are regularly checked to an H&S schedule which can be reassuring. You and your helpers must know where the fire alarm is, what to do in the event of an earthquake, where the exits are. Could you find the first aid kit and fire extinguisher quickly. You must then include this vital



Terry ZL3QL enthalls the kids with facts and figures on a spaceship called KiwiSAT at the sixth ZL3 Buildathon 15 July 2010

information in your introduction on the day. Explain to all adults present what they must do to help younger folk to promptly leave the venue in the unlikely event of an emergency.

After The Event

Consider asking all participants to complete a simple feedback form. This can be very instructive. Seek suggestions on kits folk would like to build or how to make the Builders Guide better. And yes, 10 year olds can quickly "cut to the chase" and be very bold with suggestions. So be prepared to listen carefully to what they say. All feedback can help you to make the next event even better than the last. Speak with your helpers for feedback too; and a genuine word of thanks goes a long way today. And don't forget to tell NZART, "Break In" and the "Infoline" Editors.

Sources Of Help

The rewards for holding a community building event, like a Buildathon, are numerous. Be

aware though it's definitely not like holding a club night, nor a kit building session for hams. It does involve a degree of careful advance planning and plain hard work by a lot of people. A real team effort. If you are thinking of holding a Buildathon do get in touch. We have built up some useful resources that we want to share with you. Just ask. If you know a group or school that would love to be part of the next ZL3 Buildathon, please ask them to visit <http://sites.google.com/site/zl3buildathon/> and then email ZL3DWS@nzart.org.nz.

Acknowledgements And Thanks

Sincere thanks are extended to Christchurch City Council, NZART Radioscience Education Trust Inc and the NZ Vintage Radio Society Christchurch for funding; and to all those at NZART Christchurch Branches 05, 56, 68 and all others for your loyal team support and talents. You can all be justly proud of what you have achieved for Amateur Radio and your communities.



Nicky Wagner MP Christchurch Central, shares in the fun at a ZL3 Buildathon on 8 July 2010

What is the NZART Radioscience Education Trust?

The Trust is a fund from which money will be made available for charitable purposes and the objectives of the Trust are set out in a Deed of Trust. It is structured to operate as a charitable trust to maximise the benefits to the recipients. It is governed by three Trustees who are responsible for all aspects of the Trust's operation.

What are the Trust's objectives?

The objectives for which the Trust has been established are to apply the Trust's assets within New Zealand to promote and encourage education in radioscience, whether by payment of course fees for worthy candidates, the provision of prizes for excellence in educational activities, grants-in-aid, or otherwise as the Trustees think fit. Beneficiaries do not have to be members of NZART, nor will members receive preference.

How does the Trust work?

Currently the Trust provides prizes and awards for students offering a project or exhibit having a radioscience theme at local school Science and Technology Fairs. Organising this activity involves NZART members at national and Branch level throughout the country. The Trust also offers "Grants-in-Aid" to schools to assist in the development of Science Fair projects and also to organisers of similar promotional activities such as "Buildathons", etc.

Where does NZART fit into this Trust?

The Deed of Trust specifically sets the Association aside from any involvement. In effect, the Trust will be transparent to the Association since the awards, their control, and the financial aspects of the Trust are totally under the control of the Trustees.

How will the Trust's finances grow?

The Trust operates from the income generated by the capital invested and the accrued interest is used to finance the awards and prizes etc. Apart from the foundation donation, other significant capital has come from anonymous donors and surpluses from NZART conferences.

The Trustees welcome inquiries from any person or organisation wishing to support the Trust by donation; replies will be treated in the strictest confidence. The Trustees intend that the fund should grow at least in line with inflation to ensure benefits are not eroded. The Trust is recognised by the IRD as a "Charitable Trust". Briefly, this means that the Trust's income is not taxable and that in most cases donations to the Trust are tax-deductible.

Who are the Trustees and how are they appointed?

The four Trustees are all NZART members of long standing who hold the Association, its aims and objectives at the highest level. The present Trustees are:

Terry Carrell ZL3QL, Christchurch. Life Member, Past-President, and ex-IARU Liaison Officer.

Peter Norden ZL2SJ, Featherston; a former President of NZART.

John Walker ZL3IB, Christchurch. Editor Break-In

Grahame Fraser ZL3SJ Christchurch; Associate Editor Break-In

The President of NZART, in consultation with the Vice-President, will appoint the Trustees as and when necessary.

The Science and Technology Fair Organisation

Nationally, the Science and Technology Fair scheme is sponsored by a number of organisations and, at present, there are 22 regional Science and

Technology Fairs whose winners go on to take part in the National Science and Technology Fair. More information on these may be found on the Royal Society's web page <www.rsnz.govt.nz>

What are the prizes for?

The aims of the Trust are broad. The Trustees wish to support and encourage all and any aspect of radioscience. Relevance to amateur radio is a plus but not a prerequisite. For the time being the Trust sponsors a prize to the value of \$100 at each of the local area Science and Technology Fairs. Local NZART Branches are asked to provide judges and other forms of support for these events. Prizes will only be awarded where the judges consider there is a worthy recipient.

Starting in 2007 the Trust offered limited "Grants-in-aid" to support suitable radioscience projects in schools and other promotional activities such as "Buildathons". Full details and application forms appear in Break-In and are on the Trust's web page <www.nzart.org.nz/nz/trust.html>

It is hoped that in the long term this two-way exchange will generate interest in radio and electronics leading to more young radio amateurs. At the same time it provides Branches with a means of local involvement and recruitment.

Looking ahead: let's talk about the Trusts, bequests and your will

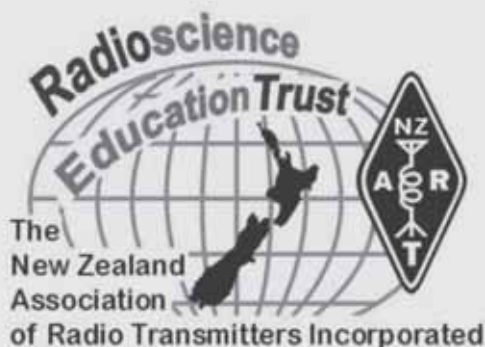
By supporting the Trust you can partake in the development of new and exciting communications technology that is rapidly adding more options for a career, education, international understanding, and a wonderful pastime. You can help preserve this experience and pass it on to a new generation of New Zealanders by contributing to the Trust. You can be part of the future now!

It's quite natural to wonder about the future. Potential contributors may ask in what way they can support the NZART Education Trust throughout a lifetime or beyond. You may have had in your amateur radio activity an experience that has enriched your life, or seen or heard of something special that you wish to help perpetuate. Perhaps the Amateur Service with its many facets of activity, and public service, has made a lasting difference to your life, education and career.

A practical way to ensure future interest in Amateur Radio is by making a bequest to the Trust. The legally binding obligations on the Trust, as set out in its Deed of Trust, ensure that your donation will be preserved and used exclusively for the purpose intended, the promotion and encouragement of education in radioscience. We recommend strongly that a solicitor provide assistance when you are considering a bequest, or any modification to your will, as the law must be considered when executing a bequest. Your solicitor can assist you to tailor your will to your precise needs.

The NZART Radioscience Education Trust is a Charitable Trust founded the NZART Inc to promote and encourage education in radioscience. The Trust's income is tax-free and donations to the Trust are tax-deductible to the extent permitted by the Income Tax Act 1994.

Correspondence regarding the Trust, grant applications and contributions should be addressed to: The Trustees, NZART Radioscience Education Trust, PO Box 1733, Christchurch 8140. Information about the Trust is also available on the NZART web site <<http://www.nzart.org.nz/nzart/nzart/trustweb.html>>.



Hands on – to RADIO WAVES

Coordinator: Fred Johnson MNZM ZL2AMJ

With support from: The NZART Radioscience Education Trust

The aims of this project:

- To promote an interest in the science and technology of wireless communications in young people.
- To encourage members of the teaching profession to use amateur radio in school to further their teaching of science and technology.
- To provide education and training for educators in the science and technology of wireless communications.

For further Information: <http://www.nzart.org.nz/waves/radiowaves.html>

NZART RADIOSCIENCE EDUCATION TRUST

Application for a Grant-in-Aid

Applications are invited from secondary school science teachers and other training providers for Grants-in-Aid from the NZART Radioscience Education Trust to promote the development of projects in the general areas of radio and/or electronics. It is anticipated that these projects will lead to entries in the local area Science & Technology Fair. Grants will not normally exceed \$250.00.

Applications should normally be received no later than 30 April of the year of application. Application forms may be obtained from; The Trustees, NZART Radioscience Education Trust, PO Box 1733, Christchurch 8140, or from <trustee@nzart.org.nz>. Applications should be endorsed by the Head of Science or, for other organisations, the President/Chairperson.

Application for a Grant-in-Aid

(Please type or print)

Name of Applicant _____ Date _____

Name of School/Organisation _____

Postal address _____

Phone () _____ Email _____

Brief description of project(s) _____

Purpose for which grant is requested (eg purchase of equipment, etc) _____

Item(s) requested and cost; _____

At the conclusion of the project materials and/or equipment purchased with this grant shall remain the property of the school/organisation.

I agree to the above conditions and declare that the information given above is correct.

Signed _____ HoD Science / Chairperson

Please send this application form to The Trustees, NZART Radioscience Education Trust, PO Box 1733, Christchurch 8140.

SPAM

by Roy Symond
ZL2KH

Secretary/Treasurer:
Roy Symon, ZL2KH
25 Annandale St,
New Plymouth
Phone: 06-758-2156
E-mail: zl2kh@xtra.co.nz

Librarian and Archivist:
John Nicholson, ZL1AUB
30 Alfred St
Fairfield
Hamilton 2001
Phone: 07-855-5435
E-mail: j.nicholson@clear.net.nz

Meetings

The Annual General Meeting is

held annually at Queen's Birthday Weekend in conjunction with the NZART Conference.

Aims and Objects

To preserve Amplitude Modulation as a means of Amateur Radio communication.

General

In order to keep expenses to a minimum, membership lists, financial statements, information, etc., sought by members will be sent on receipt of a stamped and addressed envelope. The information sought will be sent

as soon as possible.

Nets

There are nets operating at present on AM on 3.850 MHz at the following times:
Friday evenings at 2000 hours (Northern area based).
Those interested are urged to call "CQ AM" on 3.850 MHz AM any evening at 2000 hrs local time if they want a QSO.

Subscription

\$5.00, payable once only on joining. A collection will be taken up each year at the Annual

General Meeting, and donations will always be acceptable.

Bulletins

Bulletins are sent out regularly by e-mail to those who have provided their e-mail addresses. These are sent by the "blind copy" method so individual's addresses are not circulated to everyone. The bulletins include news, requests for information, parts and equipment available, parts or equipment wanted, plus anything else that might be of interest to members.

WARO

by Lynnette McDonald
ZL1LL

Call-sign ZL6YL

Object

To promote and encourage interest in Amateur Radio amongst women.

WARO was formed in 1961-62 by a small but keen group of YL transmitters and has steadily grown both in numbers and enthusiasm.

For the annual subscription (currently \$15.00 (decreasing to \$10.00 if paid at the end of August) for New Zealand members) members receive four quarterly Bulletins containing items of interest to operators and friends, with special attention to YL activities.

Associate members — YLs who do not have a transmitting licence are welcome, as are YLs from overseas, many of whom are sponsored by ZL members.

Friends of WARO — persons who support WARO may become Friends of WARO by making a donation of not less than the current subscription.

The **Thelma Souper Memorial Contest** is held annually in early April in honour of our founder. It is open to YLs and OMs and is held on the lower end of the 80 m band.

The **WARO Achievement Award** may be awarded annually to persons nominated by their peers for outstanding achievements in any aspect of Amateur Radio. Nominations close at the end of March each year and the Award is presented at the AGM in June.

The form this takes is the Myrtle Earland Memorial Rosebowl in honour of New Zealand's first licensed YL.

WARO also operates several awards including the WARO Award and the Mountain Buttercup Award. For further details on these see the Awards section elsewhere in this Call Book.

Elected Officers

President

Margaret Bretherton ZL1MB
<tedmarg@clear.net.nz>

Vice-President

Vacant

Secretary

Lynnette McDonald ZL1LL
<lynnette.mcdonald@xtra.co.nz>

Treasurer and Membership Applications

Janet Musto ZL1JAN
janetmusto@xtra.co.nz

Immediate Past President

Lynnette McDonald ZL1LL
<lynnette.mcdonald@xtra.co.nz>

Executives

Ann Fraser ZL3TNT
<zl3tnt@yahoo.com>
Bev Gillman ZL3OV
<bgillman@kinect.co.nz>
Ngairi Jury ZL2UJT
<ngairiej@slingshot.co.nz>

Awards Manager

Lynnette McDonald ZL1LL
<lynnette.mcdonald@xtra.co.nz>

Contest Manager

Bev Osborne ZL1OS
<zl1os@slingshot.co.nz>

Sponsorship Secretary
Celia Reed ZL1ALK
<c.reed@xtra.co.nz>

Librarian/Archivist
Joline Beale ZL1UJB
<joline@paradise.net.nz>

Official Broadcast Co-ordinator
Rosemary Boshier ZL1RO
<rboshier@ihug.co.nz>

Break-In Columnist

Lynnette McDonald ZL1LL
<lynnette.mcdonald@xtra.co.nz>

Bulletin Editor

Bev Osborne ZL1OS
<zl1os@slingshot.co.nz>

YL Nets

WARO VHF Auckland
Sunday 7 pm NZ time 146.625 MHz (Klondyke)
WARO HF WARO
Mondays 8pm NZ time 3.695MHz ±.
WARO Executive
Second Sunday 0800 UTC 3.695MHz ±.
International ALARA
Mondays 1030 UTC 3.580 MHz. YL "222": Mondays 0600 UTC 14.222 (Net Control June VK4SJ).
VE/VK/ZL: Fridays 0500 UTC 14.148 MHz.

DX sponsorship

It is great to sponsor a YL from another YL organisation — increases your awareness of other countries and their people. We have DX sponsored members from all over the world and it does help to forge greater bonds

between all of us. To sponsor a YL contact the Sponsorship Secretary for further information and contacts. It costs the value of a DX membership subscription and gives the chance to exchange news and views with each other.

YL Get-Togethers

These are held regularly throughout the country as well as the annual Get-Together at the time of our AGM in June. Consider going along to these affairs — they are a lot of fun.

WARO Bulletin/Break-In page

Copy is always required for these publications and any news/ views of/by or from members are very welcome by the two editors concerned. Photographs are especially welcome — how about sending some in NOW. Enquiries are always welcome from any YL for membership/ fellowship in all of our activities. Feel free to contact any of the above-mentioned YLs or any other member of WARO. And always be on the lookout for ZL6YL — our own call-sign.

WARO on the Internet

<www.qsl.net/zl6yl> or <www.nzart.org.nz>. Visit the WARO website where you will find past issues of the WARO Bulletin and WARO news. There is also a comprehensive history of WARO, and links to DX YL amateur radio organisations.

NOTES

NOTES

NOTES

TAIT IS PROUD TO SUPPORT NZART

While we strive for global success in communication solutions, we never forget our roots.

www.taitradio.com

Portables

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